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ABSTRACT

This study seeks to discover which aspects of a student's background, alone or in combination with the kind of school attended, play the greatest role in achievement. The paper presents results of a wide variety of analyses that explore different aspects of family background and the school as they relate to achievement of students of differing racial-ethnic and sex-group membership and geographical origin. The individual student is the primary unit of analysis. The principal finding is that, although factors of home and family greatly outweigh school factors in achievement, all the differences in achievement associated with racial-ethnic group membership can be accounted for by considerations that are social in nature and origin. The greatest role is played by a set of motivational factors that are closely related to child rearing practices. The most important are: (1) the expectations that both the student and his parents have for his school performance; (2) the extent to which families engage in activities that are supportive of these expectations; and (3) the student's understanding of the importance of hard work to success, as well as the possible benefits of an education. (Author/LP)

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# A STUDY OF THE ACHIEVEMENT OF OUR NATION'S STUDENTS

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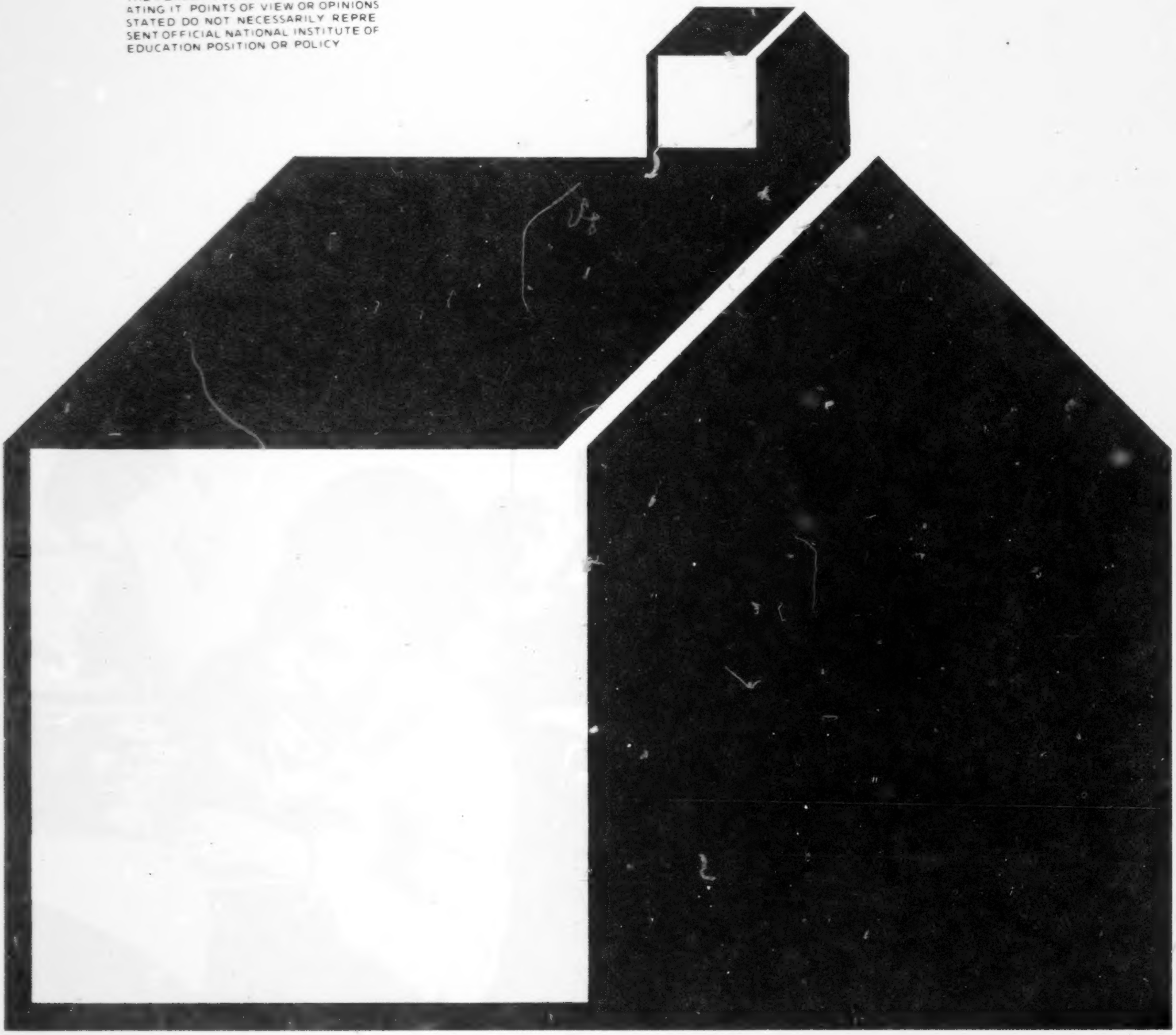

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# A STUDY OF THE ACHIEVEMENT OF OUR NATION'S STUDENTS

by
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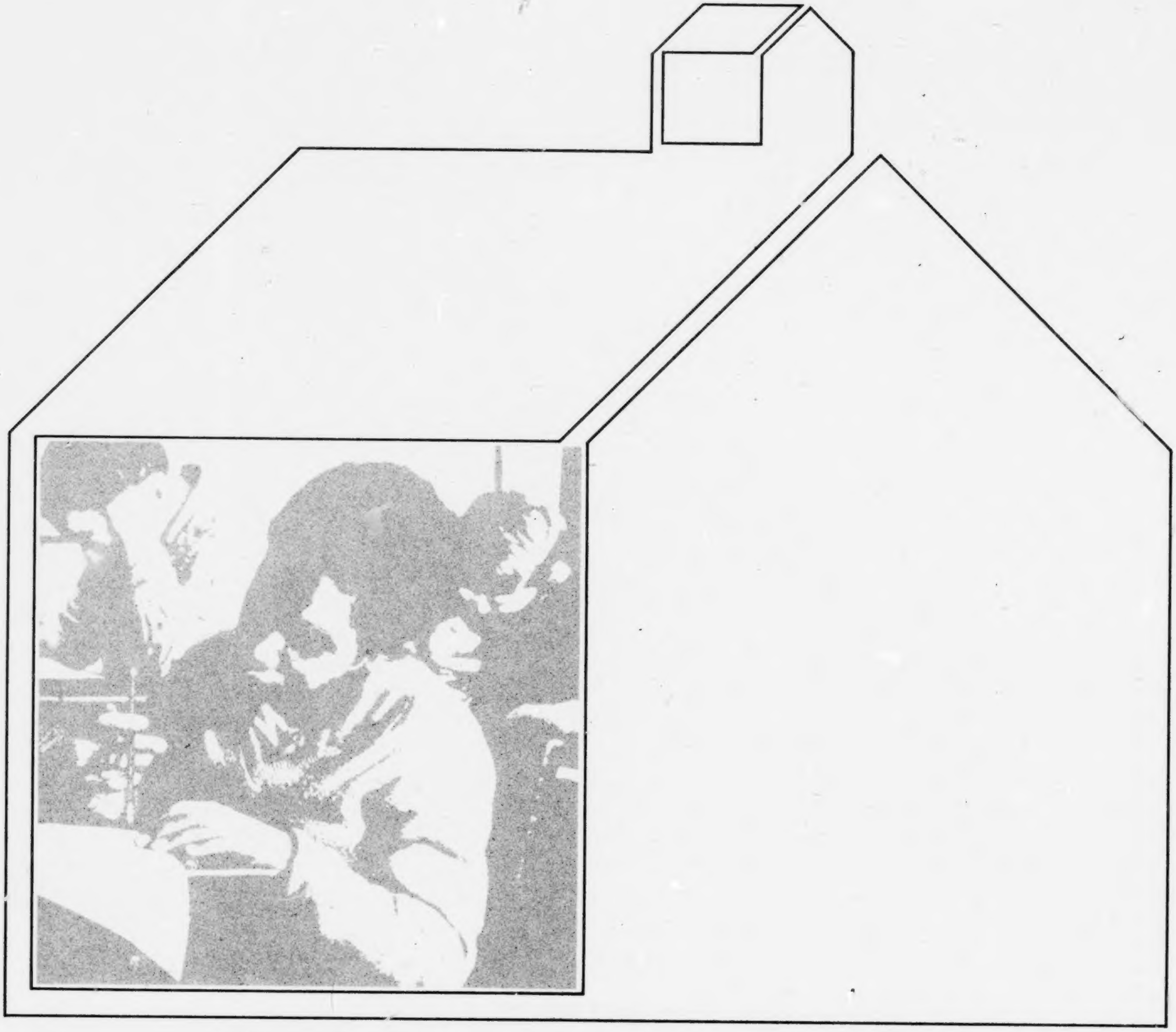
With a Foreword by Alexander M. Mood



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# Foreword

This is the third volume of information to grow out of the U.S. Office of Education's landmark survey of educational opportunity in the Nation's public schools. The first was the immediate report of the survey entitled "Equality of Educational Opportunity," but better known as the Coleman Report. The second was "A Study of Our Nation's Schools," produced by a team of analysts in the U.S. Office of Education headed by Dr. George Mayeske. It provides a remarkable quantitative exploration of the differences in average educational achievement among schools and how they are related to various characteristics of the communities, families, students, teachers, facilities, and programs associated with the schools.

This third volume by essentially the same team gives us an equally remarkable analysis of how individual student achievement is associated with important aspects of home background, community, ethnicity, socioeconomic status, schools, and attitudes toward education. It is remarkable because for the first time we are given some reliable quantitative assessments of the strength of these associations by experts who have used sophisticated analytical techniques with great skill to obtain them. As a result we can be much more confident about spelling out educational problems that are generally understood in a vague sort of way but not well documented. Perhaps before plunging into the quantitative analysis, some readers would like to have a brief overview of the main features of educational opportunity in the United States as they have been illuminated by these three volumes.

The vaunted upward mobility said to be provided by universal public education is not much in evidence. By and large, the schools go along with society's tendency to route children of privileged families into privileged positions, and to route underprivileged children into underprivileged positions. It is not a plot on anybody's part or a conscious policy of education; it is just the way things work out. The final outcome is that the average mediocre upper class child emerges with a college degree, the ticket to upper class jobs, while the average mediocre lower class child emerges without a degree and must be content with lower class jobs. Partly it is a matter of money, of course, but largely it is a matter of how education is carried out in our homes and schools.

Children of poor families often enter the first grade with a significant disadvantage in familiarity with the elementary symbols and tools of education—numbers, letters, simple words, books, pictures, vocabulary, and the traditional children's stories which teachers can refer to in attempting to get ideas across to the children. The disadvantage arises to a degree from the lack of time on the part of the parents to engage in the processes which introduce children to those tools; it is not lack of money, for example, to buy children's books because those books can be found in libraries; it is not lack of education because education is sufficiently universal in the United States that only in the rarest families will both parents be unable to deal with the symbols and tools of education at the most elementary level; it is not lack of awareness because poor families firmly believe that education is essential to the success of their children and frequently look upon education of their children as the key to escaping their unenviable social and economic position. Poor families do not have time to devote to their children; they are endlessly forced to trade time for money—to search for work, to moonlight, to find cheap food, to seek out an acceptable inexpensive place to live, to try to find a cheap secondhand spare part for a disabled car or appliance, to try to figure out how to replace the part themselves or to try to find a knowledgeable neighbor who can spare a little time to help them out, to search for a person who will loan a little money in an emergency at less than a confiscatory rate of interest, to struggle with the vast complication of bureaucracies when one has no friends or relatives who work in them and understand how they operate, to stave off frightening installment collectors in order to catch up with payments to even more frightening ones, to plead with merchants who have overcharged them to be merciful, to lose one's way in the maze of public transportation trying to get to a day's work in a strange neighborhood, to walk and walk and walk when one does not have bus fare, to entreat the landlord to honor his commitments, to trudge all day through the mystifying maze of the county hospital with a crying sick child in search of a little reassurance, to endure the sneering petty persons who dispense free public services to the poor. This debilitating struggle to keep alive without money in a complex highly organized society is so frustrating, so humiliating, so emotionally exhausting, that one's patience and strength are totally spent when one finally gets home to one's children. Since children can be exasperating, it would not be wise to try to communicate with them in such a state; the only sensible thing to do is collapse in front of the TV with a few cans of beer.

Thus, underprivileged children tend to begin their schooling at the foot of the class. A few exceptionally able ones overcome that handicap and catch up with the rest. A few lucky ones find themselves in schools with high morale and high standards for all so that they get well educated in spite of their handicap. The sad story for most, though, is that they are immediately branded as poor learners. What is more, that mark stays with them throughout their years of schooling and shapes their entire lives. It is all over in a few weeks, the dream of moving upward; it is destroyed by a minor educational handicap which produces low scores on early aptitude tests, which requires early teachers to work a little harder with them, and which confirms many a teacher's prejudices about the intelligence of poor people and of certain ethnic minorities. The child learns all too quickly that he has been categorized as a slow learner and what is expected of a slow learner. He is soon convinced that he *is* a slow learner. His behavior confirms the written record that follows him from grade to grade. He is clearly not "college material." He is clearly destined for the lower echelons of society. The same goes for his children—in all probability.

Thus generation after generation, society passes out the goodies to the privileged and the scraps to the underprivileged. And it is such a marvelously guilt-free process. Is it the fault of the teachers that the little things begin school less ready to learn than their more fortunate peers? Obviously not. Is it the fault of the privileged? What an ungenerous thought. No, it is just a simple fact of life. Low educational achievement naturally accompanies low socioeconomic status. The good students are in the good schools with the good teachers in the good neighborhoods. The poor students are in the poor schools with the poor teachers in the poor neighborhoods.

The association of achievement with family background is measured by the largest bar in the upper left-hand triple in figure 5.1; it shows that about 85 percent of the variation in average achievement between schools is associated with measures of the family background of the children attending the schools. The percentage rises to 90 percent when ethnicity is included as an element of family background, as shown by the long bar in the triple immediately below the upper left triple. A better measure of the discrimination of schools against children on account of their ethnicity is seen in the two bars immediately to the left of the two long bars referred to above. The upper one shows that about 41 percent of the variation in individual student achievement is associated with family background excluding ethnicity; the bar immediately below it shows that the percentage rises to about 49 percent when ethnicity is included as an element of family background. The 41 percent takes account of socioeconomic status, family structure and stability, and the extent to which families assist children with their education before starting school and as they attend school; the additional 8 percent is, therefore, a measure of the extent to which achievement is depressed purely on account of a child's ethnicity.

The bulk of the present volume is concerned with detailed analyses of the relationships between the various background factors mentioned above and educational achievement, as well as other educational outcomes such as motivation and plans for obtaining postsecondary education. Comparisons of the relationships are made between various ethnic groups, between urban and rural districts, and between geographical regions. As was the case in the other two volumes, there is no way to distinguish clearly between the effects of different underlying factors on educational outcomes. A large part of achievement can be associated with family background and a large part with school characteristics, but these two large parts overlap considerably and there is no way to discover whether the overlap really should be associated with the family or with the school. These overlaps are measured in the commonality tables found throughout the volume which show, for example, what proportion of variations in achievement can be uniquely associated with home background, what proportion can be assigned uniquely to school factors, and what proportion can be assigned to either (the overlap or common part).

Perhaps the reader would like to be warned that the unique parts can be very small and hence that ratio between unique parts can fluctuate wildly as, for example, occurs in the right-hand column of table 2.3, where ratios are formed of the unique parts of variation associated with socioeconomic status (SES) and with family structure and stability (FSS). There, SES is indicated to be quite significant relative to FSS for the white and Negro ethnic groups but not for the other four ethnic groups. If one takes the position that the common part is assignable to either SES or FSS and might be included in both the numerator and denominator of the ratio, then the fluctuations in the ratios would be very much diminished. But that would put a bias in the other direction, i.e., make them fluctuate too little. Since the unique and common part are exhibited along with the ratios in table 2.3, there will be no problem of judging the nature of the relationships.

Incidentally it may be worth mentioning that the word "white" as used in this study excludes Mexican-Americans because it was desired to examine that ethnic group separately with respect to its educational opportunity along with the other major ethnic subgroups of the population —Negro, Oriental-American, Indian American, and Puerto Rican. The word "white" simply designates the majority ethnic group. "Anglo" might have been used instead but it is not accurate either.

It may also be worth pointing out one other small matter that I failed to catch on my first quick reading and that is an effect of the normalizing procedure often used in the report of dividing two unique parts and their common part by the sum of the three so that the three parts add up to 100 percent. The sizes of the three can appear to change anomalously when the total changes if one forgets that the total has changed.

Finally I would like to mention again, as I did in the foreword to the earlier Mayeske study, that we owe the basic data for these studies to the courage of Francis Keppel, who was U.S. Commissioner of Education at the time of the survey. He took it upon himself to persuade the educational establishment to cooperate with the U.S. Office of Education to provide the data knowing that the establishment was very much against permitting the Federal Government to invade local control of education to the point of giving achievement tests to students. He was most persuasive, and as a result we have an extremely valuable collection of data relating educational outcomes to important social factors that affect those outcomes. The present study alone is convincing verification of his judgment at the time that these data would be well worth the unusual investment of his personal prestige that would be required to get them. And this study is not the last. Dr. Mayeske and his staff are already at work on two other studies: One of them will focus on teachers and the other on motivation. We can safely bet that both will bring extremely illuminating insight to the educational process when we consider how effectively the first two studies have done so.

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*at Irvine*

# Preface

This report presents the results of a wide variety of analyses that explored different aspects of family background and of the school as they related to the achievement of students of different racial-ethnic and sex-group membership and in different regions of the country. The purpose of this report is to serve as a reference source by summarizing and displaying structural properties of the data, and to show how these structural properties permit information to be obtained about the possible effects of family background and school influences on achievement. The findings of this study are integrated with a few other studies that were deemed especially relevant. A thoroughly comprehensive literature review and integration would require a separate work.

It should be pointed out that this report is addressed in the first instance to research personnel engaged in studying family background and school influences. It is therefore primarily technical in nature. However, summaries of our findings will be found in both chapter 1 and chapter 9, while the findings of most interest for administrators and policy makers are highlighted in the Abstract and in chapter 10. A detailed exposition of the statistical techniques used can be found in the Technical Supplement, not printed here but available under separate cover from the senior author.

There are two other reports in preparation that utilize this same data base. One of these focuses on student motivation while the other focuses on the teachers. There are two earlier reports that also used this data base (Coleman et al., 1966; Mayeske et al., 1969). This report differs from the earlier of these reports as follows: (1) the variables in this study were empirically scaled and empirically grouped into indices whereas in the earliest study this was done judgmentally; (2) in this study racial-ethnic group membership, sex, and region are used as both stratifying and quantitative variables whereas in the earliest study racial-ethnic and regional groupings of students were kept separate and sex differences were not investigated; (3) a larger number as well as different types of variables were used in this study than in the earliest study; (4) in this study the full number of students and schools were used whereas in the earliest study subsamples were used; (5) results are presented here in terms of commonalities and unique variance explained whereas in the earliest study they were reported in terms of unique or added variance explained at different points in the analysis. In spite of these differences, the findings of the two studies, where they are comparable, are remarkably similar. Indeed, the findings of this study strongly reinforce and extend those of the earliest study.

This report differs from the second report (Mayeske et al., 1969) primarily in the unit of analysis that was used. In this study the individual student was the primary unit of analysis whereas in the earlier study the school was the primary unit. As a consequence of these different ways of aggregating the data, the percentages obtained from the school analyses in the two studies will be found to differ somewhat. The manner of organizing the data in this report also allowed a number of topics to be investigated that could not be in that earlier report. These are: possible within-school and student body influences; and subgroupings of students by sex, racial-ethnic group membership, and region of the country.

This report represents the culmination of a team effort in which each of the authors contributed according to his specialized interests and background. The extraordinary talents of Albert E. Beaton, Jr., in statistical calculus allowed us to organize unusually large masses of data and subject them to complex multivariate analyses in a simple and economical manner. He also devised the criterion scaling technique. Carl E. Wisler, with an initial assist from Alexander M. Mood, performed most of the developmental work on the commonality model. He also provided many helpful comments on early drafts of the manuscript. The commonality model was later generalized to the multivariate case by Beaton. A monumental share of the data processing and analysis was performed by Tetsuo Okada, after an initial assist from Wallace M. Cohen. In addition, Mr. Okada not only conducted the analyses and wrote the section on Oriental-Americans, but also provided thoughtful detailed comments on different versions of the manuscript. His contributions were especially instrumental in bringing this study to fruition. The extensive and attractive tabular work was done by Kathryn Crossley. This study also profited from the early efforts of Frederic D. Weinfeld, Kenneth A. Tabler, John M. Proshek, David S. Stoller, and Harry Piccariello. The senior author is solely responsible for the techniques used, and the content of the study, and its presentation.

The labors of this team could not have reached fruition without the initial impetus given to the work by Alexander M. Mood, when he was Assistant Commissioner for Educational Statistics, and the later support of the work by Joseph N. Froomkin and John W. Evans when the staff was transferred under the authority of the Assistant Commissioner for Program Planning and Evaluation. To them this work is most heavily indebted. This report has benefited greatly from the thoughtful review and constructive comments of Alexander M. Mood, James S. Coleman, and William G. Cochran, and from the abiding interest of Daniel P. Moynihan. The organization and style of this report were improved through the editorial efforts of John M. B. Edwards. Pat Dever helped fulfill many of the administrative requirements associated with an undertaking of this magnitude. Shirley Stevens has worked many long and hard hours during the past two years typing different versions of the manuscript. At times she received assistance in this arduous task from Louise Powell, Eulean Hollis, Yvonne Curry, Frances Levine, Marilyn Miller, and Rhonda Lewis. After the report had been edited for publication it was entirely retyped by Mary H. Johnson.

The authors are particularly indebted to Dr. Jerolyn R. Lyle for first suggesting the division of student variables into family structure and process, to Dr. Edward Casavantes for stimulating us to extend our analyses of racial-ethnic group differences in achievement and suggesting a simple paradigm for presenting these results, and to Dr. Sue Klein for suggesting the exploration of sex differences in educational plans. The authors are also grateful for the continuing interest shown in their work by their numerous colleagues and their efforts to isolate us from many administrative tasks. Without the effort of all these people this report would not have been possible.

GEORGE W. MAYESKE

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# Abstract

According to the Coleman Report, the influence of the public schools on a child's level of achievement is rarely independent of his or her social background, and this relationship, given the structure of U.S. society and its method of assigning children to schools, is the chief source of inequality in education. The present study, which drew on the same body of data as the Coleman Report, essentially confirmed these findings, but with some major modifications and refinements. The purpose of the study was to find out which aspects of a student's background, whether alone or in combination with the kind of school attended, play the largest role in achievement. Since the Moynihan Report had drawn widespread attention to the high rate of father absence in Negro families, the student's family structure was one variable of interest. However, it appeared that its effects were closely related to those of socioeconomic status and racial-ethnic group membership. By means of commonality analysis, it was possible to separate the variance uniquely associated with each variable from the variance that was in common with two or more variables. The principal finding was that, although the role of home and family background factors in achievement greatly outweighs that of school factors, virtually all the differences in achievement associated with racial-ethnic group membership could be accounted for by considerations that were primarily social in nature and origin.

Moreover, despite the high rate of father absence for Negroes, the effect of family structure and stability was relatively small for Negroes *and* whites, but higher for the other racial-ethnic groups. By far the greatest role was found to be played by a set of motivational factors that were closely related to family child-rearing practices. Among these the most important were: the expectations that both the student and his parents had for his school performance; the extent to which they engaged in various activities that were supportive of these expectations; and the student's outlook on life as to the importance of hard work for success and how an education might benefit him. It made little difference whether parents or substitute parent figures engaged in these activities. However, regional analysis showed that where stratification based upon race and ethnicity was pronounced, its effect on achievement was correspondingly harder to overcome through educationally related child-rearing practices. With regard to the independent role of school factors in achievement, it was inferred that the achievement and motivational mix of the entering students set the going rate of educational performance. Once that rate was established, it had an effect on each student independently of his or her family background. Insofar as the school's teachers had an independent influence, it manifested itself through this going rate.

The same was found to be true of other school resources. The students who benefited most from this system were those who already had high achievement levels, and whose family background played a supportive role throughout the school years. The racial-ethnic groups that exhibited these characteristics to the highest degree were whites and Oriental-Americans. It was concluded that, at present, there does not appear to be any single approach by which the achievement levels of large proportions of poor children can be transformed so that they can catch up with their more advantaged counterparts in a few years. The problem is one that affects every aspect of society and cannot be solved by the schools alone. In the educational sphere a variety of approaches need to be tried, especially ones that offer a degree of experimental control. Moreover, the joint educational influence of family and school could be increased as a result of initiatives from the school. In particular, parents need to know the kinds of activity and behavior that are likely to enhance a child's school performance. Above all, parents must believe that a better life is possible for their children through education.

# Chapter 1

# INTRODUCTION

## 1.1. THE EQUALITY OF EDUCATIONAL OPPORTUNITY SURVEY

The Civil Rights Act of 1964, title IV, required the Commissioner of Education to:

> . . . conduct a survey and make a report to the President and the Congress, within two years of the enactment of this title, concerning the lack of availability of equal educational opportunities for individuals by reason of race, color, religion, or national origin in public educational institutions at all levels in the United States, its territories and possessions, and the District of Columbia.

In response to this request the Equality of Educational Opportunity Survey was carried out by the National Center for Educational Statistics of the U.S. Office of Education, directed by Alexander M. Mood. In addition to its own staff, the Center used the services of outside consultants and contractors. James S. Coleman of Johns Hopkins University had major responsibility for the design, administration, and analysis of the survey. Ernest Q. Campbell of Vanderbilt University shared this responsibility and, in the case of the college subsamples, assumed the greatest part of it. Frederic D. Weinfeld served as project officer.

The survey addressed itself to four major questions:

1. To what extent are racial and ethnic groups segregated from one another in the public schools?

2. Do the schools offer equal educational opportunities in other respects?

3. How much can students be said to learn, judged by their performance on standardized achievement tests?

4. What kinds of relationship may be supposed to exist between the level of a student's achievement and the kind of school he attends?

Work was started on the survey in the spring of 1965 with a view to administering the questionnaires and tests that fall. Approximately 70 percent of the schools that were requested to participate in the study actually did so (the colleges were made the subject of a smaller and separate survey). This entailed testing and surveying some 650,000 students, together with their teachers, principals, and superintendents, in approximately 4,000 public schools throughout the country.

On the basis of competitive bids, the Educational Testing Service of Princeton, N.J., was awarded the contract for conducting the Equality of Educational Opportunity Survey, including test administration, test scoring, data processing, and data analysis. It also consulted on various aspects of the survey and convened an advisory panel to aid in its design and analysis.

The survey used a 5-percent sample of schools. This was a two-stage, self-weighting, stratified cluster sample. The primary sampling units (PSU's) in the first stage were counties and Standard Metropolitan Statistical Areas (SMSA's). The PSU's in the second stage were high schools. When one was drawn in the sample the elementary schools feeding into that school were automatically included in the sample as well. Since the Equality of Educational Opportunity Survey was primarily concerned with the children of minority groups, and since these groups constituted only about 10 percent of the total school population, the schools were stratified according to the percentage of nonwhite students contained by each. Thus strata with higher percentages of these students were given larger sampling ratios and so were sampled more heavily. The final result was that over 40 percent of the students in the survey were from minority groups.

Separate questionnaires were administered to teachers, principals, superintendents, and students at each of the grade levels studied. The teacher questionnaire contained about 72 items covering such topics as professional training, type of school and student preferred, opinions on issues and problems of integration, and problems existing in the school. The final part of this questionnaire was a voluntary test consisting of 30 contextual vocabulary items; its purpose was to measure the teacher's verbal facility. However, the main source of information about the school was the 100-item principal questionnaire. It covered school facilities, staff, programs, racial composition, problems, curriculums, extracurricular activities, and many other school characteristics. Of course, there were also questions on the personal background and training of the principal and his opinions on problems of integration. The picture given by the teacher and principal questionnaires was further enlarged by the superintendent questionnaire, which consisted of 41 questions. These dealt not only with various aspects of the school system itself, including its expenditures, but with the superintendent and his attitudes toward current educational issues. Finally, detailed factual and attitudinal data about the students were obtained in the same way. Since this report focuses on the students, let us describe the student questionnaires in some detail.

The act required that the survey be made "at all levels." For reasons of economy, it was decided to administer the tests to a selection of grades that would be representative of the entire range. The grades chosen were first, third, sixth, ninth, and 12th, and different questionnaires were used for each of them. A special feature was the series of items on home background. In addition, there were questions on the student's attitude toward school, race relations, and life in general. Representative examples are: How good a student do you want to be in school? If you could be in the school you wanted, how many of the students would you want to be white? Good luck is more important than hard work for success (agree or disagree).

The usual personal and school data were also collected. However, it had been decided that the yardsticks for measuring the detrimental effects of poor school facilities and characteristics were to be tests of the various school-related skills. Thus the survey's test battery was planned as an integral part of the entire research design. The objective was to obtain as much test data as possible within the limitations of time and available resources. Two of the basic skills chosen were reading comprehension and mathematical ability, since these two areas are common to all school curriculums and all grade levels. Another area deemed important was the students' general level of knowledge, regardless of its source. A general information test was therefore included in the test battery. Two other ability tests were used to measure the students' verbal and ratiocinative skills.

Following this survey a report entitled "Equality of Educational Opportunity" under the principal authorship of James S. Coleman was submitted to the President and the Congress on July 2, 1966. This report has become known as the Coleman Report; the reader is referred to it for further details of the study (Coleman et al., 1966).

The findings from the Coleman Report that are of particular relevance to this study are summarized in a very general way below. Since much of the current study is an extension of this report, comparisons between the two will occur frequently in the following pages. The Coleman Report found that:

1. Family background was of great importance for achievement.
2. The relationship of family background to achievement did not diminish over the years of school.
3. Of the effect of variations in school facilities, curriculum, and staff on achievement, only a small part was independent of family background.
4. Of the school factors, those that had the greatest influence (independent of family background) were the teacher's characteristics, not the facilities and curriculum.
5. The social composition of the student body was more highly related to achievement, independently of the student's own social background, than was any school factor.
6. Attitudes such as sense of control of the environment, or a belief in the responsiveness of the environment, were found to be highly related to achievement, but appeared to be little influenced by variations in school characteristics.

In summary, the authors of the Coleman Report concluded:

> That the schools bring little influence to bear on a child's achievement that is independent of his background and general social context; and that this very lack of an independent effect means that the inequalities imposed on children by their home, neighborhood and peer environment are carried along to become the inequalities with which they confront adult life at the end of school. For equality of educational opportunity through the schools must imply a strong effect of schools that is independent of the child's immediate social environment and that strong independent effect is not present in American schools.[1]

## 1.2 A STUDY OF OUR NATION'S SCHOOLS

The Coleman Report was the first analysis of these data. It was planned to conduct further analyses of the data, and to accomplish this objective a special analysis group was formed in the National Center for Educational Statistics. The first efforts of this group culminated in a report entitled "A Study of Our Nation's Schools" (Mayeske et al., 1969), hereafter called the School Study. This report is summarized below. Some attention is given to the steps by which its conclusions were reached since much of this work is drawn upon heavily in the present study.

The School Study addressed itself to the following question: How do the school's characteristics influence such things as the achievement level of all the students in the school?[2] However, before an answer could be obtained to this question the following technical problems had to be dealt with:

1. How could discrete categorical variables such as Father's Occupation best be scaled so that they could be meaningfully interpreted and related to other variables of interest?
2. How could provision be made for nonlinear or curvilinear relationships that might otherwise remain obscured?
3. How could estimates be made of missing data, particularly when the very students who failed to provide an answer to a question were of great interest?
4. How could the more than 400 variables be reduced so that the task of data processing and analysis would become less complex?

To perform the kind of analysis required and at the same time resolve the above problems a number of logical steps were evolved and translated into the necessary computer programs (see appendix A). The primary statistical tools used were regression analysis and partition of multiple correlation. As a result, we were able to distinguish between:

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[1] P. 325.

[2] Compare one of the questions addressed in the present study: How do the school's characteristics relate to the achievement levels of the different kinds of students it gets?

1. Percent of school outcome associated with the distinguishable influence of the school's characteristics.
2. Percent of school outcome associated with the distinguishable influence of the student's social background.
3. Percent of school outcome that could just as well be associated with either one.

The conclusions that resulted are stated below in the form of a series of hypotheses. Some of the concepts and methods used to build these hypotheses are described in later sections of this chapter.

1. Very little of the schools' influence on their students can be separated from the influence of the latter's social background. Conversely, very little of the influence of the students' social backgrounds can be separated from the influence of the schools. The children who benefit most from their schooling are those who:
    - (*a*) Come from the higher socioeconomic strata rather than from the lower socioeconomic strata.
    - (*b*) Have both parents in the home rather than only one or neither parent in the home.
    - (*c*) Are white or Oriental-American rather than Mexican-American, Indian American, Puerto Rican or Negro.
2. Until the 12th grade, the distinguishable influence of the student's social background, that is, the part of it that can be separated out, is usually larger than the distinguishable influence of the school. At the 12th grade, however, the distinguishable influence of the school is greater than the distinguishable influence of the student's social background for most of the motivational and attitudinal outcomes, while the opposite is true for achievement.
3. The common influence of the school's characteristics and the student's social background on the attitudinal and motivational outcomes differs for the different grade levels. For achievement, however, the common influence is consistently larger than either one alone. This common influence increases the longer the student stays in school.
4. Schools that perform well on one outcome tend also to perform well on other outcomes. These performances tend to facilitate and reinforce one another. For the attitudinal and motivational outcomes a school's generalized favorable performance has a large distinguishable influence. It also has a common influence with the student's social background. For achievement, the influence of a generalized favorable performance is manifested in common with the school's characteristics and the student's social background.
5. The school variables most heavily involved in school outcomes are those concerned with actual characteristics of the school's personnel, as distinguished from the school's physical facilities, pupil programs and policies, and even personnel expenditures, including teachers' salaries.
6. Chief among these characteristics of school personnel are ones that reflect experience in racially imbalanced educational settings. Most nonwhite teachers had attended predominantly nonwhite educational institutions and were teaching predominantly nonwhite students. Nonwhite educational settings, it was suggested, tend to have associated with them lower levels of achievement and motivation, as well as less favorable socioeconomic and family conditions. The result is less adequate preparation than that received in predominantly white institutions.

## 1.3. THE PRESENT STUDY

Unlike the School Study in which the school was the unit of analysis, the present study focuses on individual students and the ways in which they may differ from one another. Throughout the ensuing chapters the unit of analysis is almost always the individual student. When possible school influences are studied it is usually in order to learn how they impinge upon the individual student. The major questions for which answers are sought in this study are:

1. What roles do different aspects of the student's family background play in the development of his achievement?
2. What roles do different aspects of the school play in the development of individual achievement when they are juxtaposed with family background factors?

These questions are explored for students in different geographic regions of the country, for students of different racial and ethnic group membership, and for boy-girl differences. The survey involved the testing and surveying of about 650,000 students.

The amount of information generated from such a large survey was voluminous: for example, there were approximately 400 items of information available on the students, teachers, principals and schools. This was obviously too much information to analyze or even to comprehend in its raw state. Consequently, a program of analysis was undertaken to reduce these 400 items into a more manageable number by grouping items that were obviously related to one another. For example, we developed an index of a school's special staff and services by grouping the number of art, music, speech, and remedial reading teachers it had together with the number of its guidance counselors, librarians, and nurses and, finally, a measure of its provisions for handling mental health problems. This program of analysis reduced the number of items from 400 to a more manageable number, between 60 to 70 (Mayeske et al., 1969, p. 3). These aggregated items are used here.

For this study many of these items were grouped into two main divisions, each with two subdivisions. The first, called Family Background, was in turn divided into two subdivisions: Home Background, and Family Process. Home Background contained items that referred primarily to the social structural aspects of the family, namely, socioeconomic status, presence or absence of key family members, and family's racial-ethnic group membership. Family Process contained items pertaining to the attitudes and behavior of the student and his family. These included the expectations that the student and his parents had for his school performance, the educational and occupational aspirations of the parents for the student and of the student for himself, the extent to which each of them engaged in activities that were supportive of those aspirations, and certain aspects of the student's beliefs about life—how important he thought hard work was for success and how he believed an education might benefit him personally.

The second main division was called School Characteristics. It contained items of two main types. The first type, Student Body Characteristics, pertained to aggregate attributes of the students each child went to school with, including their achievement levels, expectations and aspirations, outlook on life, and involvement in intellectual activities. The second type consisted mainly of items pertaining to school facilities and the training of school personnel—their experience, the kind of college they attended, their racial and ethnic composition, average verbal skills, and average salary. It was called the Comprehensive Set of School Variables.

In addition there were also items that pertained to Achievement, that is, the skills acquired by the individual student in his everyday life and the things he had learned in traditional academic areas.

A large number of statistical analyses were performed interrelating items from these two main divisions. We were particularly interested in:

(a) The percent of Achievement that could be associated with the distinguishable influence of Home Background.

(b) The percentage of Achievement that could be associated with the distinguishable influence of Family Process.

(c) The percentage of Achievement that was shared by both Home Background and Family Process, or, in other words, could not be separated into (a) or (b).

Before we embarked on our analyses, we recognized that there might be some problems in trying to isolate the effects of certain factors, since they were closely bound up with other factors. We anticipated, for example, that there would be a greater incidence of family disruption for low than for high socioeconomic groups. As a check on these expectations we plotted the average socioeconomic status and average family structure (that is, the average of students in each group on the family structure index) for each of the racial-ethnic groups. Figure 1.1 shows that our expectations were fulfilled to a marked degree: as the socioeconomic status of each group increases, so too does its family structure. Whites score highest, with regard to both variables; they are followed by Orientals, with the other groups trailing by varying amounts. These results suggested to us that the effects of socioeconomic status, family structure, and racial-ethnic group membership were indeed intertwined and would be difficult to disentangle (see pp. 16–18 for details).

In coping with this methodological dilemma, extensive use was made of a technique called commonality analysis. Basically, what this technique does is to partition the variance in a dependent variable that is predictable from two or more sets of regressor variables[3] into (*a*) the proportion that can be uniquely associated with each set, and (*b*) the proportion that is in common with two or more of the sets. A discussion of this technique is given in appendix A.[4] Here, one might ask what meaning can be attributed to each of them. The unique portions represent the variance that can be uniquely associated with one of the sets. In the strictest sense the common portions represent our inability to separate out the functioning of one set from the other. Nevertheless, in making inferences about the possible influence that the different sets of variables have on the dependent variable, it would seem that both the unique and the common portions could represent influences. The common portions might represent the joint influence of two or more sets of variables, or they might represent the fact that the occurrence of one attribute is accompanied by the occurrence of a second attribute. For example, students from the lower socioeconomic strata are more likely to have a less intact family structure, to be less well motivated, and to have lower achievement, and so on. This line of reasoning is further reinforced if we recognize that the unique portion for a set of variables, which is usually considered as representing a causal influence, can be moved up to the common portion when a new set of variables is entered into the analysis with it. This occurs for example, when motivational variables are entered into the analysis with socioecomonic status and family structure.

Much of this study is devoted to systematic examination of how the relationship of family background and school factors with achievement differs for different subgroups of students. For example, differences among these relationships are explored for students in different areas of the country, for students of different racial-ethnic group membership, and for boy-girl differences. A sequential procedure, described more fully in the Technical Supplement, was used to test systematically for the extent of these subgroup differences (for a detailed account of this procedure see Beaton, 1964; Wilson and Carry, 1969). The procedure, which utilizes various sums of squares and mean squares from a covariance analysis, runs as follows:

> $H_1$: *Are the cell (or subgroup) regressions (including the cell intercepts and slopes) similar to the overall regression obtained when all students are combined without regard to their subgroup member-*

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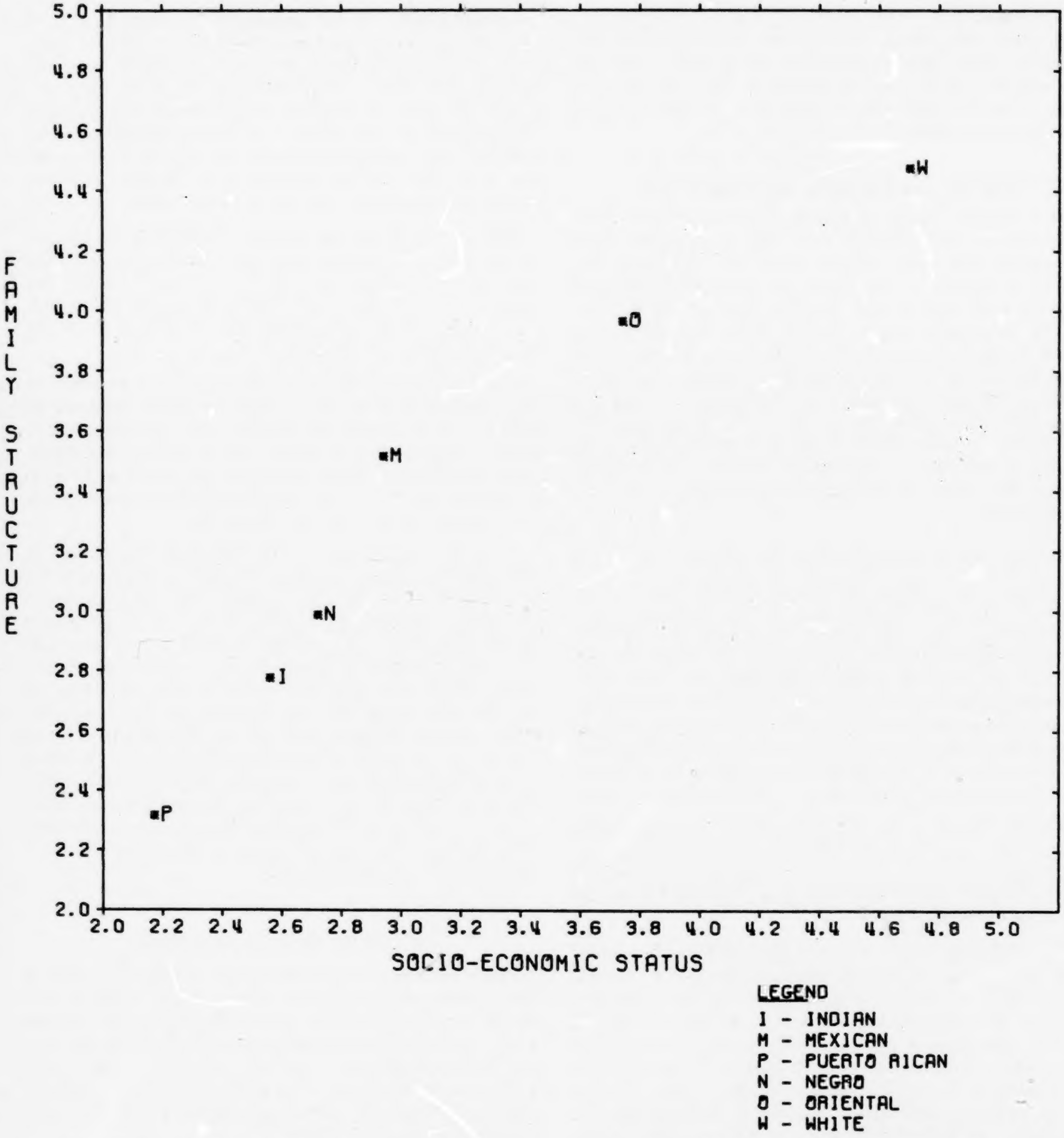
[3] Those variables against which the dependent variable is regressed.

[4] A mathematical discussion is given in the "Technical Supplement," available from the senior author at: U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

FIGURE 1.1. - RELATIVE LEVELS OF SOCIO-ECONOMIC STATUS AND FAMILY STRUCTURE AND STABILITY, FOR SIX RACIAL-ETHNIC GROUPS



*ship?* If this hypothesis is accepted then the sequence is terminated. However, if this hypothesis is rejected then the next hypothesis in the sequence is tested.

$H_2$: *Are the cell slopes or regression weights (excluding the cell intercepts) similar to the overall slope obtained when all students are combined without regard to their subgroup membership?* If this hypothesis is rejected then the sequence is terminated. However, if the hypothesis is accepted then two more tests are available for distinguishing between different kinds of intercepts. Since only these first two hypotheses are of interest in this study the others available under this procedure will not be discussed. In each case, the $F$ statistic is used to determine whether to accept or reject the hypothesis.

If, when this framework is used, the subgroups are found to differ, then comparative commonality analyses are usually run in order to determine how the relative roles of the relevant sets of variables may change from one group to another.

### 1.3.1. Definition and Description of Variables Used

This section contains a detailed description and interpretation of the variables and sets of variables used throughout the study. When indices are discussed, the reader is referred to the Technical Supplement for the weights used in their construction. Most of the student indices were more adequately represented at the higher grade levels, (six, nine, and 12) than at the lower ones (one and three). This is because at the lower grade levels fewer questions were asked about the family, and for those questions asked the teacher, not the student, had to provide the information. In many cases the teacher was unable to provide an appropriate answer. As a consequence, data from the lower grade levels are seldom used in this study.

### INDIVIDUAL STUDENT INDICES AND VARIABLES

*Socioeconomic Status* (*SES*). A student with a high score on this index has parents who come from the upper educational strata. His father is engaged in a professional, managerial, sales, or technical job, and there are two to three children in the family. They are more likely to reside in the residential area of the city or the suburbs rather than in the inner city, and their home is likely to have from six to 10 rooms. Intellectually stimulating materials, such as books, magazines, newspapers, and television and radio programs, are available in such a home.

*Family Structure and Stability (FSS)*. A student with a high score on this index has both parents in the home, his father's earnings are the major source of income, his mother works part time or not at all, and his family has not moved around much.

*Racial-Ethnic Group Membership (RETH)*. A student with a high score on this variable is white, a student with an intermediate score is Oriental-American, and a student with a low score is Puerto Rican, Mexican-American, Indian American or Negro American. In a society that discriminates on the basis of skin color, one's membership in a particular racial or ethnic group is very much a social category with many behavioral implications. Accordingly, an individual's score on this variable represents his membership not only in a physical category but in a social category as well.

*Expectations for Excellence* (*EXPTN*). A student with a high score on this index says that his mother, father, and teachers want him to be one of the best students in class, and that he also desires to be one of the best in his class.

*Attitude Toward Life (ATTUD)*. A student with a high score on this index feels that people who accept their condition in life are not necessarily happier; that hard work is more important for success than good luck; that when he tries to get ahead he doesn't encounter many obstacles; that with a good education he won't have difficulty getting a job; that he would not sacrifice anything to get ahead nor does he want to change himself; that he does not have difficulty learning nor does he feel that he would do better if his teachers went slower; and that people like him have a chance to be successful.

*Educational Plans and Desires* (*EDPLN*). A student with a high score on this index says that his parents want him to go to college; that he himself both desires and plans to go to college and aspires to one of the higher occupational levels; and that he feels that he is one of the brighter students in his class.

*Study Habits* (*HBTS*). A student with a high score on this index has frequent (weekly or more) discussions with his parents about his school work, and was read to regularly as a child. He spends 1 to 3 hours a day studying and 1 to 3 hours a day watching TV, would make most any sacrifice to stay in school, and has seldom stayed away from school just because he wanted to.

*Achievement* (*ACHV*). A student with a high score on this index or composite tended to score high on all of the tests that entered into that composite. For all grade levels the tests of verbal and nonverbal ability were used as part of the composite. In addition, at grades six, nine, and 12, tests of reading comprehension and mathematics achievement were used and at grades nine and 12 a test of general information was included in the composite. This inclusion of more tests at the higher grade levels represents the nature of the educational process, in which basic skills are acquired in the early years and other skills and knowledge attained through the use of these basic skills. As shown in the Technical Supplement, these tests at each grade level were sufficiently highly correlated to be included in a single composite.

### STUDENT BODY VARIABLES

When the values of a variable are averaged for each of the students in a particular grade level of a school, this results in what is called a Student Body variable. Schools with a high mean or average on a Study Body variable tend to have a larger proportion of students with a high score on that attribute, while schools with a low mean or average tend to have a larger proportion of students with a correspondingly low score.

The Student Body variables used in this study are:

Socio-Economic Status
Family Structure and Stability
Racial-Ethnic Group Membership
Expectations for Excellence

Attitude Toward Life
Educational Plans and Desires
Study Habits
Achievement

## SCHOOL VARIABLES

In this study, to represent attributes of the schools other than Student Body variables, the following comprehensive set of 31 indices and variables is used (for a detailed description, see Mayeske et al., 1969, pp. 22–90). It has been divided into three subsets: Facilities, Pupil Programs and Policies, and School Personnel and Personnel Expenditures. All but seven of the 31 variables are indices. There were no problems of measurement at the lower grade levels.

### *Facilities*

Plant and Physical Facilities
Instructional Facilities
Pupils Per Room
Age of Buildings

### *Pupil Programs and Policies*

Tracking
Testing
Transfers
Remedial Programs
Free Milk and Lunch Programs
Accreditation
Age of Texts
Availability of Texts
Pupil-Teacher Ratio
Enrollment

### *School Personnel and Personnel Expenditures*

Principal's Experience
Principal's Training
Principal's College Attended
Principal's Sex
Principal's Estimate of the School's Reputation
Specialized Staff and Services
Teacher's Experience
Teacher's Training
Teacher's Socio-Economic Background
Teacher's Localism
Teacher's College Attended
Teaching Conditions
Teaching-Related Activities
Preference for Student-Ability Level
Teacher's Sex
Teacher's Racial-Ethnic Group Membership
Teacher's Vocabulary Score

In the following chapters the above set of variables is referred to as the School Set (SCHL).

**Definition and Description of Sets of Variables.** Throughout the ensuing chapters a number of sets of variables are used recurrently. The variables that makeup each of these sets are described and analyzed in this section, and a rationale is given for their inclusion.

*Home Background (HB).* This label is applied to the set of variables that represent the human and material resources in the immediate home environment. When each of the racial-ethnic and sex groups is kept analytically separate, Home Background consists of the student's Socio-Economic Status and Family Structure and Stability. When these different groups are kept together, a variable called Racial-Ethnic Group Membership is often introduced into the analyses under the same general label.

*Family Background (FB).* This set consists of the Home Background and Family Process sets; it therefore covers all aspects of the individual student's background. When separate analyses are run for each racial-ethnic group, Family Background contains only the Home Background variables of Socio-Economic Status and Family Structure and Stability. The relationships among these sets of variables are given in schematic form in figure 1.2.

There are, in addition, four sets of variables at the school level:

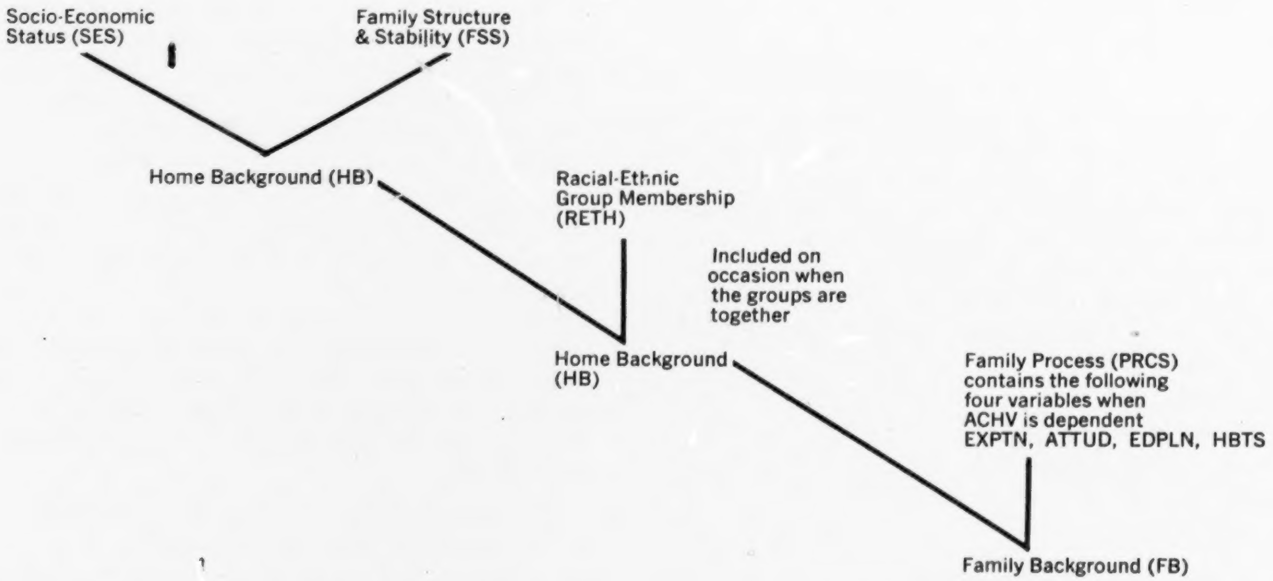
> *School (SCHL)*: This is the comprehensive set of 31 variables described previously.
>
> *Student Body Social Background (SBSB)*: This set consists of the three Student Body variables of Socio-Economic Status, Family Structure and Stability, and Racial-Ethnic Group Membership. It is the counterpart of Home Background (including Racial-Ethnic Group Membership) at the individual level.
>
> *School Outcomes (SO)*: This is the set consisting of five Student Body variables: Expectations, Attitude Toward Life, Educational Plans, Study Habits, and Achievement. It is called School Outcomes because each of these variables can be regarded as being influenced, at least in part, by the school. The composition of this set does *not* vary according to the individual student dependent variables.
>
> *Family Process (PRCS)*: This set is the exact counterpart of Family Process at the individual level. Consequently, the same name is used. Its composition varies as follows:

| *Dependent Variable* | *Composition of Process at School Level* |
|---|---|
| Student Body Achievement | The four Student Body variables of:<br>Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, and Study Habits. |

This latter Process set at the school level is normally used only for analyses among schools.

**Geographic Groupings.** In a number of chapters comparative analyses are conducted for different geographic groups. The four basic groupings are: Metropolitan (MET); Nonmetropolitan (NONMET); North; and South. The standard census tract was used to define metropolitan and nonmetropolitan areas as used in the sam-

FIGURE 1.2.—A Schematic Diagram of the Variables Included in the Different Sets


Socio-Economic Status (SES)
Family Structure & Stability (FSS)
Home Background (HB)
Racial-Ethnic Group Membership (RETH)
Included on occasion when the groups are together
Home Background (HB)
Family Process (PRCS) contains the following four variables when ACHV is dependent EXPTN, ATTUD, EDPLN, HBTS
Family Background (FB)

pling design. The South was defined to include the 16 southeastern and southwestern States of Alabama, Arkansas, Arizona, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, Tennessee, Virginia, and West Virginia. Included as North were all the remaining States.[5]

## 1.4. THE ACHIEVEMENT OF OUR NATION'S STUDENTS: AN OVERVIEW

It should not be forgotten that the purpose of this survey was to explore equality of educational opportunity. Accordingly, we wanted to incorporate information about racial-ethnic group membership into our analysis on the same basis as the other variables. In order to do this, we assigned each student a score that corresponded to the achievement of his racial-ethnic group. Under this procedure, whites were scored highest, Orientals next highest, and all the other groups low. The results, which were supported by other analyses, indicated that Racial-Ethnic Group Membership behaved like a structural variable, and therefore should be included as an aspect of the student's Home Background rather than as an aspect of Family Process.

For example, in one set of analyses we looked at the average achievement for each group before and after different aspects of the students' background had been taken into account. These analyses showed that as more aspects of their background were taken into account the achievement levels of the different groups came closer and closer together. This effect is illustrated by the following table.

| Group | Before[a] | HB[b] | FB[c] | FB, Area, School |
|---|---|---|---|---|
| Indian American | 44.0 | 47.6 | 48.2 | 48.6 |
| Mexican-American | 42.0 | 45.5 | 46.4 | 47.4 |
| Puerto-Rican | 38.3 | 43.8 | 45.4 | 47.1 |
| Negro | 42.3 | 45.3 | 44.9 | 49.3 |
| Oriental-American | 49.3 | 50.5 | 50.6 | 51.1 |
| White | 53.0 | 51.7 | 51.6 | 50.5 |

[a] These averages are expressed in terms of an overall distribution with a mean of 50 and standard deviation of 10.

[b] HB = SES + FSS

[c] FB = HB + PRCS

The "Before" column reflects the differences among the groups in their achievement levels before any aspects of differences among students in their background conditions have been taken into account. The HB and FB columns present the averages for the different groups after Home Background and Family Background (that is, HB plus PRCS) have each been taken into account. The final column presents the means after these differences in background, area of residence, and the kinds of students one goes to school with (viz, the student body's achievement and motivation mix) have been taken into account. These latter mean differences are very small. Hence, we have accounted for almost all of the differences among students in Achievement that are associated with their racial-ethnic group membership by considerations that are primarily social in nature and origin. On the basis of these results, which show that the social structural aspects of the family account for a large proportion of these group differences, as well as other extended analyses, we classified Racial-Ethnic Group Membership (RETH) as an aspect of Home Background (HB). Accordingly, as one kind of comparison that can be made when looking across all groups of students, RETH was systematically entered into the analyses as an aspect of HB.

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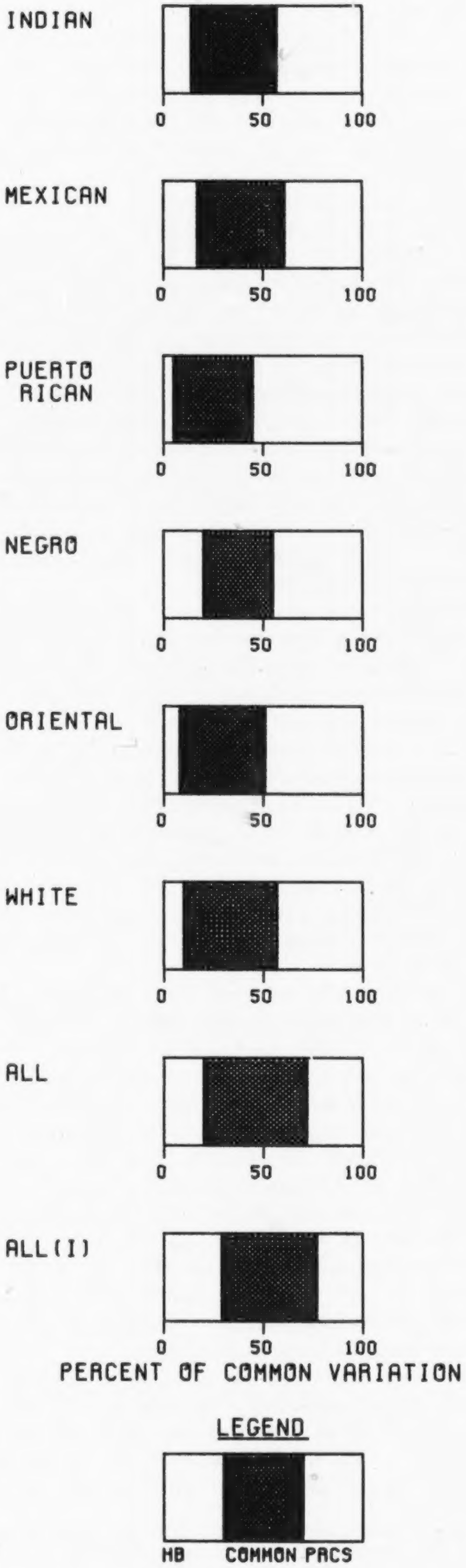
[5] On one occasion the North was subdivided into two sets: Far Western and Rocky Mountain States of Alaska, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming; and Other, consisting of the 23 other northern States. On another occasion analyses were run for only the middle Atlantic and Far Western States.

The first topic we chose to pursue was the role that Family Structure and Stability (FSS) played in Achievement (ACHV), after differences among students in Socio-Economic Status (SES) had been taken into account. We reasoned that family disruption (as measured by FSS) might be expected to have detrimental effects on ACHV, and particularly, that a father's absence might be more detrimental for boys than for girls. What we found was that the effect of FSS on ACHV, both before and after SES was taken into account, was relatively small for Negroes and whites and larger for the other groups. There was also a slight tendency for the effects of FSS to be greater for boys than for girls. This smaller role of FSS for whites and Negroes than for the other groups was also observed for different regions of the country (North-South and Metropolitan-nonmetropolitan) and for different grade levels. How could it be, we asked ourselves, that the effects of FSS on ACHV were so similar for whites and Negroes when the incidence of family disruption was so much greater for the latter? Further, why should the effects of FSS be small for these latter groups but larger for the other groups? Could it be that these results reflected fundamentally different processes? Or were there other factors to be considered—factors that would be applicable to all groups?

In order to pursue this question, we examined the effects of whether or not English was spoken in the home. This turned out to have negligible relationships with ACHV; the relationships that did exist could be explained almost completely by differences among students in their SES. But when we looked at Family Process (PRCS), we found some of the answers. These analyses showed that FSS had a large role, independently of SES and RETH, in three motivational variables that could be considered as intervening between the structural aspects of the family and ACHV. These were: (*a*) the expectations that both the student and his parents had for his school performance; (*b*) the extent to which they engaged in various activities that were supportive of these expectations; (*c*) the student's outlook on life as to the importance of hard work for success and how an education might benefit him.

In order to illuminate the role of these PRCS factors we entered them into the analysis with the HB factors, especially SES and FSS. The percent of ACHV explained by HB and PRCS that can be uniquely associated with one or the other set and that which is common to both is shown in figure 1.3. Inspection of this figure shows that for each group the role of PRCS factors (indicated by the white area on the right) exceeds that of HB factors (indicated by the white area on the left), often to a substantial degree. When all the students are combined (the ALL case), the role of PRCS factors still exceeds that of HB but to a somewhat lesser degree. When RETH is entered as an aspect of HB (the ALL(I) case),[6] the percentage role for PRCS decreases while that of HB increases. These latter two comparisons show the effects of differences *among* the six racial-ethnic groups in their HB and

FIGURE 1.3. - THE ROLE OF FAMILY BACKGROUND MEASURES IN ACHIEVEMENT



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[6] Only for the ALL(I) case is RETH included as an aspect of HB.

PRCS as well as the differences among students *within* each of the groups. All analyses show that there is a substantial motivational component (as shown by PRCS factors) in ACHV that is independent of their HB. In figure 1.3, the large common portions (the dark area in the middle) indicate that the higher HB families are more prone to engage in the kinds of activities that make up PRCS.[7]

We inquired next as to how these results might change by virtue of a student's area of residence. We found that for each racial-ethnic and sex group the role of PRCS factors tended to exceed those of HB factors in each region of the country with one exception. When all students were kept in the analysis together and RETH was introduced as an aspect of their HB, we observed that the role of PRCS factors got progressively smaller, while those of the HB factors got progressively larger, in the following order: nonmetropolitan North; metropolitan North; metropolitan South; and nonmetropolitan South. These results led us to generalize as follows. *Where social and economic stratification based upon race and ethnicity is pronounced, its effect on achievement will be greater and more difficult to overcome through educationally related child rearing activities than where this kind of stratification is less pronounced.*

Convinced that considerations of family process played an important role in student achievement, we wondered which aspects might be playing the greatest role. In order to explore these relationships we divided the PRCS factors into two groups. The first group, Educational Plans and Desires (EDPLN), was concerned with the student's long-range aspirations. The second, Other Motivational Measures (MTVTN), focused more on such sources of short-term motivation as expectations for the student's school performance, activities that he and his parents engaged in that were supportive of these expectations (such as reading to him when he was young, talking with him about his school work, etc.), and the student's own outlook on life.

To examine the roles of these different variables in ACHV we first set aside those aspects of ACHV that were associated with HB. As for the remaining differences in ACHV, we noted some marked sex differences. For instance, EDPLN figures more importantly in the ACHV of males than of females, while MTVTN figures somewhat more importantly for females than for males. This suggests that ACHV might occur for somewhat different reasons in males and females. When we investigated some possible determinants of male and female EDPLN, we found, independently of their HB and ACHV, that the parents' as well as the students' own expectations for their school performance played a greater role in the educational plans of girls than of boys.

One other important result of these analyses was that for all groups combined, the role of MTVTN exceeded that of EDPLN by a greater amount in the South than in the North—until RETH was entered into the analyses as an aspect of HB. When this was done, the role of EDPLN came to exceed that of MTVTN to the same extent in all regions. This indicated to us that the dependence of MTVTN and RETH on one another, as they related to ACHV, was beyond what one would expect on the basis of their common role as home background variables. Additional analysis showed that this dependence was greatest for the student's outlook on life. Since we regarded RETH as a structural aspect of the family's position in society, these results indicated that there were motivational aspects of ACHV associated with being nonwhite, independently of other home background factors such as socioeconomic status and family stability. This we regarded as the color-caste aspect of the American social structure. It was shown to be related primarily to the student's outlook on life.

So far we have focused on the determinants of achievement and how they varied for a number of different groups. We have not, however, devoted much consideration to how the average achievement of these groups might differ by sex, region, and grade level. We saw earlier that the whites had the highest average level of achievement, followed closely by that of Orientals. We also saw that their level was followed in turn by those of Indian Americans, Negroes, Mexican-Americans, and Puerto Ricans, all clustered fairly closely together. This same ordering was observed with few variations throughout the years of schooling. For example, in the first grade the relative standing of these groups was about the same as at the ninth and even the 12th grade. In most regions, and at all grade levels except the 12th, females scored slightly higher than males. At the 12th grade the males took a slight lead over the females, although the magnitude of these sex differences within each racial-ethnic group was not as great as the differences among the groups. In fact, the differences among the racial-ethnic groups were almost five times greater than the male-female differences within each group. The extent to which each of these groups differed among themselves across regions of the country at times approximated the extent to which they differed from whites. For example, the order of magnitude by which Indians differed across regions of the country was almost three-fourths of the magnitude by which they differed from whites. This value was one-third for Mexican-Americans, while Oriental-Americans differed across regions to a much greater extent than they did from whites. Also, there were sufficient differences in achievement among Negroes and Puerto Ricans, independent of their family background, for us to conclude that area of residence was an important factor in their level of achievement.

But how, we may ask, does the school a student attends figure in all of this? We observed a pronounced tendency for students of the same kind of family background, particularly racial-ethnic and socioeconomic background, to go to school with one another. In an earlier study (Mayeske et al., 1969) we noted a highly systematic relationship between the attributes of the teaching staff and the racial-ethnic and socioeconomic composition of the student body. Because these kinds of relationships might not be apparent if the racial-ethnic groups were kept sepa-

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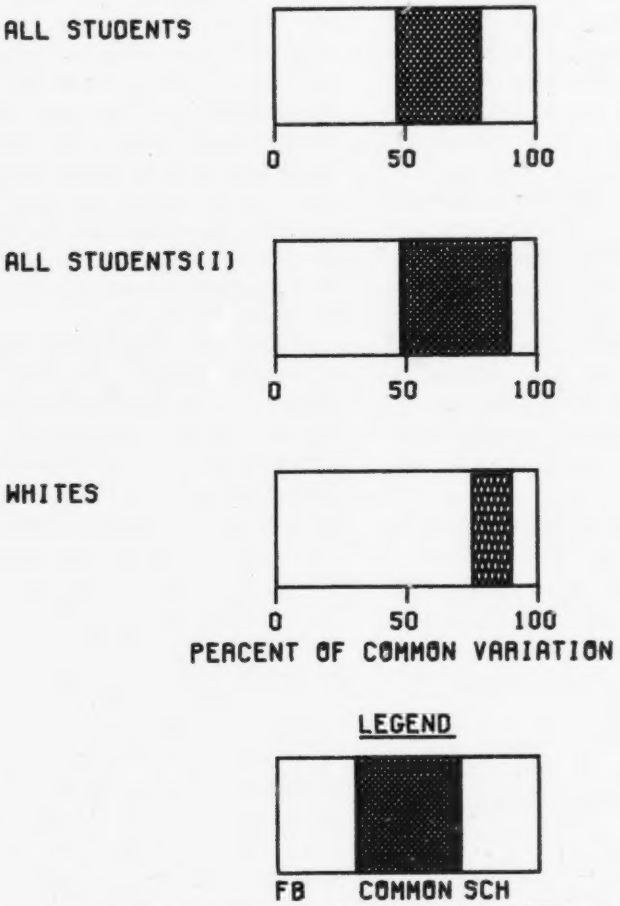
[7] Sex differences were also noted in these relationships. However, across both regions and grade levels, these differences did not consistently favor one group over another.

FIGURE 1.4. - THE ROLES OF FAMILY BACKGROUND AND SCHOOL FACTORS IN ACHIEVEMENT



rate, we decided our most appropriate framework for studying possible school influences was when all of the groups were kept together.

Analyses of the percent of Achievement (ACHV) explained by Family Background (FB) and School Characteristics (SCH) (including those of the student body) are shown in figure 1.4. The first set of analyses, called All Students, showed that 47 percent of ACHV is associated with FB, 21 percent with SCH, and 32 percent was common to them both. When RETH was entered into the analysis that we called All Students (I), the proportion explained by FB increased by one percent and that of SCH decreased by 11 percent, while their common portion increased by 10 percent. This can be compared with the results for whites, which showed that the role of FB was very large, while that of SCH was about the same as in All Students(I), but with a very much smaller common portion. These analyses showed that the confounding and possible interplay of FB and SCH factors was much greater when all students were included in the same framework. This was due to the systematic relationship of school resources and student attributes mentioned earlier. We may learn more about the nature of this relationship by inquiring as to which aspects of FB, HB, or PRCS played the greater role in ACHV when put in context with SCH. These analyses showed that 5 percent of ACHV could be associated with the student's HB and 22 percent with PRCS, while SCH retained its value of 10 percent. The remaining 63 percent was inseparably intertwined in the relationship of each set with the other as they impinged on ACHV. For example, 21 percent was common to HB and PRCS, 21 to HB and SCH, and 21 percent to all three. These results show the large independent role played by PRCS, as well as the manner in which aspects of HB and SCH are intertwined with ACHV.

Returning to the kinds of analyses shown in figure 1.4, we observed that for All Students(I) (i.e., when RETH is included as an aspect of FB) the percentage role for FB always exceeded that for SCH, but that the extent of this departure was much greater in the North than in the South. Further, not only the percentage uniquely attributable to SCH but also the percentage common to both sets of variables was greater in the South than in the North. How could it be, we asked ourselves, that the effect of the schools on achievement that is independent of a student's family background is greater in the South than in the North?

In order to answer this question we first performed extensive analyses in order to isolate the kinds of school characteristics that were related to achievement independently of a student's family background (i.e., we explored the 10 percent that was unique to SCH). These analyses showed that the proportion of the student body scoring high (or low) on ACHV and PRCS played a greater role than the proportion scoring high or low on HB—which it will be remembered, includes Racial-Ethnic Group Membership. These analyses also showed that of the attributes of the teaching staff a set of five out of a total of 11 played the largest role in ACHV. These pertained to the teaching staff's racial-ethnic composition, verbal skills, view of their teaching conditions, preference for students of different levels of ability, and training and salary levels. When juxtaposed, the achievement and motivational mix of the student body exceeded that of these five teacher attributes by a factor of about 6 to 1. However, there was sufficient overlap or confounding of these student body and teacher attributes as they related to ACHV for us to feel that the influence of the teacher attributes actually made itself felt through the student body composition. We also noted that this kind of overlap was greater in the South than in the North.

On the basis of these results, it was inferred that the basic process of schooling runs somewhat as follows:

1. There is a pronounced tendency for students with the same family background characteristics, especially the same socioeconomic status and racial-ethnic group membership, to go to school with one another.
2. Since ACHV is correlated with Family Background, it follows that there is wide disparity among schools in the ACHV levels of their entering students.
3. The ACHV mix of entering students sets the going rate of performance. Once this is established, it has an effect on each student independently of his own family background. The attributes and possible influence of the teachers are manifested in large measure through this going rate.

Since the allocation of students into schools on the basis of their family background is more pronounced in the South, it follows that the effect of this going rate would be greater there. It also follows that the confounding of teacher attributes with the going rate would also be greater in the South.

Who, then, benefits most from this process? We saw earlier in this chapter that students who entered school at a relatively high level of achievement managed to sustain it throughout the years of schooling, whereas students who entered at a low level stayed low. Most of these group differences were attributed to family background and the role it shares with school characteristics. What is uniquely attributable to the school is the establishment of a going rate for achievement that is initially dependent upon the achievement levels of the entering students but, once established, operates independently of their family background. Thus the students who benefit most from their schooling are those who enter school with high-achievement levels and whose family background plays a sustaining and supporting role throughout the years of schooling. And their school performance is affected above and beyond possible family background effects by the achievement and motivational mix of the students they go to school with. As we noted earlier, about 10 percent of the explainable differences among students in achievement could be uniquely associated with school factors, another 48 percent was uniquely associated with family background, and 42 percent was associated with both family background and school factors. Those students who score high in achievement both before and after the years of schooling are whites and Oriental-Americans, and they are also the ones who, as groups, rank high on all of the family background factors. More generally then, *with respect to achievement, the outputs of schooling are the inputs of society.*

We also investigated the role played by different aspects of family background after considerations of Racial-Ethnic Group Membership and the characteristics of the schools students attended were first set aside. These analyses showed that, for these latter conditions, the aspect of family background we have called Family Process played an even greater role than we had hitherto observed.

In view of these results we conclude that, for all groups, it is not so much the mere presence of key family members that makes a difference for student achievement. Rather, be they parents or parental surrogates, it is the nature of their involvement that is the important consideration. Children who come from a home where education is highly valued are more likely to be read to before they start school. Their parents are more likely to talk with them about their schoolwork and to have definite plans for their school performance and later education. It is not surprising, then, that they are far more likely to benefit from their school experiences than are children from homes where these influences are not present. This relationship holds good independently of the level of human and material resources in the home. Nevertheless, such resources are an important consideration, particularly for nonwhites. For them, we suggest, the effects of depressed socioeconomic status are more difficult to overcome than for whites. Given two children of the same family background, as we have defined it, the one who attends a school that has a higher proportion of high-achieving, college-oriented students will have a somewhat higher achievement level than one who attends a school with a lower proportion of such students. However, to the extent that family background and school influences on achievement are separable, the former outweighs the latter in its effects on achievement by a factor of about 5 to 1.

## 1.5. SUMMARY

The Equality of Educational Opportunity Survey, which was carried out by the U.S. Office of Education under the Civil Rights Act of 1964, attempted to determine: The extent of racial and ethnic segregation in the public schools; whether or not the schools offered equal educational opportunities in other respects; the amount that students could be said to learn, judged by their performance on standardized achievement tests; and the kinds of relationship that might be supposed to exist between the level of a student's achievement and the school he attended. Some

650,000 students, with their teachers, principals, and superintendents, were tested and surveyed in about 4,000 public schools throughout the country. For reasons of economy, only students in grades one, three, six, nine, and 12 were included in the analysis.

The results of this survey were published in a report entitled "Equality of Educational Opportunity," generally known as the Coleman Report (Coleman et al., 1966). The authors of the report concluded that, in general, the public schools exerted very little influence on a child's achievement independently of his or her family background and social context.

Further analyses of these data were undertaken by the authors of the present report. The first of these analyses to be published was "A Study of Our Nation's Schools," referred to here as the School Study (Mayeske et al., 1969). The purpose of the School Study was to distinguish the influence of the school on achievement from all other influences. By means of various statistical techniques, the authors were able to separate out the percentage of school outcome associated with the distinguishable influence of the school's characteristics, the percentage associated with the distinguishable influence of the student's social background, and the percentage that could be associated with either. It was concluded that: little of the school's influence on the students could be separated from the influence of their social background, and vice versa; the distinguishable influence of social background was greater until the 12th grade, when the school's influence became greater for most of the motivational and attitudinal outcomes, though not for achievement; the common influence of school and social background on achievement was consistently greater than that of either one alone and increased the longer the student stayed in school; schools that performed well on one outcome tended to perform well on other outcomes; and the most influential school variables were those connected with characteristics of the school's personnel, especially whether they had attended predominantly nonwhite educational institutions.

In the present study, on the other hand, the unit of analysis was the student. We were concerned with how various aspects of the student's family background affected his achievement, and with how various aspects of the school affected his achievement when juxtaposed with family background factors. These questions were explored by region, racial-ethnic group, and sex. Over 400 separate items of information were gathered from each of about 650,000 students, and then formed into between 60 and 70 indices for purposes of analysis. Two main sets of indices were employed: Family Background, and School Characteristics. The former was divided into Home Background and Family Process, the latter into Student Body Characteristics and the Comprehensive Set of School Variables.

In our analysis, we were concerned mainly with establishing relationships between the two main sets of indices. Our chief concerns were: the amount of achievement that could be uniquely associated with Home Background; the amount of achievement that could be uniquely associated with Family Process; and the amount that was shared by both these subsets of variables. The technique used for this purpose was one known as commonality analysis.

Differentiation by race and ethnicity was introduced into our analysis in the form of a score assigned to each student on the basis of his racial-ethnic group's mean achievement. We found that this variable, which we called Racial-Ethnic Group Membership, was more structural than behavioral. We therefore entered it into the analyses as an aspect of Home Background.

Our first topic was the effect of family disruption on achievement. Both before and after allowing for differences in socioeconomic status, we found that this effect was relatively small for Negroes and whites, and larger for all other groups, regardless of region or grade level (though it was slightly greater for boys than for girls). The reason for this unexpected effect turned out to be the role played by Family Structure and Stability in the three motivational variables we called Family Process (PRCS). Our results led us to the conclusion that the more pronounced the effects of social and economic stratification based on race and ethnicity, the harder it was to overcome these effects through the kinds of educationally related child rearing activity represented by Family Process.

In order to examine the role of PRCS in more detail, we divided it into Educational Plans and Desires, on the one hand, and Other Motivational Measures, on the other. Marked differences were then noted in the influence of these subsets of variables by sex, region, and racial-ethnic group membership. Differences in achievement were also explored by sex, region, and grade level.

Finally, we studied the influence of the school. Our first series of analyses, undertaken for all racial-ethnic groups combined, showed that 48 percent of Achievement was associated with Family Background, 21 percent with School Characteristics, and 32 percent with both. Entering Racial-Ethnic Group Membership into the analysis served to increase the common portion and decrease the portion of School Characteristics, while that of Family Background remained virtually unchanged. Here, our most salient general finding was that the roles of Home Background and Family Process, when juxtaposed with School Characteristics, are inextricably intertwined.

We further observed that the independent role of School Characteristics was greater in the South. In our efforts to uncover the reason for this we found that the influence of the teachers' attributes, which played the largest role, tended to make itself felt through the composition of the student body. This led us to formulate a provisional descriptive model of the educational process according to which: (*a*) students of similar family background tend to go to school together; (*b*) schools vary widely in the achievement levels of their entering students; (*c*) the achievement mix of entering students sets a "going rate" that, once established, affects each student independently of his family background. In the South, family background played a greater role in determining which school the student attended and so in the level of achievement he was likely to reach .

It followed from this that students who entered school at a higher level of achievement generally stayed high and students who entered at a low level stayed low. The students who benefit most from their schooling are not simply the ones for whom family background plays a motivating and sustaining role; they are also the ones who begin their schooling with a high level of achievement that, once established, persists independently of family background. Under these circumstances the students who scored highest in achievement both before and after the years of schooling were whites and Oriental-Americans. On the other hand, when the influence of both Racial-Ethnic Group Membership and School Characteristics was set aside, Family Process played an even greater role.

We concluded, then, that the crucial factor in achievement was not so much the presence or absence of parents or parental surrogates as the nature of their involvement in the educational process. However, economically depressed nonwhites find it harder to overcome the effects of their low status by such means than do economically depressed whites. In this sense, the outputs of schooling are the inputs of society.

# Chapter 2

# HOME BACKGROUND AND STUDENT ACHIEVEMENT

By the time a child enters school he has already accumulated a store of learning experiences. Many if not most of these experiences arise from his relationships, or lack of them, with parents, siblings, and playmates. Such early socializing agents may play a critical role in the development of his abilities. Not only may they stimulate him to learn; they may offer learning experiences that will be of use in the mastery of later learning situations (Hebb, 1949; Hunt, 1961; 1969). A number of large-scale studies have further documented the effects of early socialization on later student achievement and motivation (Flanagan, 1964; Coleman et al., 1966; Shaycoft, 1967; Husén, 1967; Plowden, 1967).

## 2.1. ACHIEVEMENT AND RACIAL-ETHNIC BACKGROUND

Here, our main concern is with the way in which, for students of different racial and ethnic backgrounds, both the structural aspects of the family and the activities of parents with their children are involved in the development of achievement. These structural aspects are represented by the indices of Socio-Economic Status (SES) and Family Structure and Stability (FSS). Together, these two indices are called Home Background (HB). The behavioral aspect of parents' relationships with their children is represented by the four indices of: Expectations for Excellence (EXPTN); Attitude Toward Life (ATTUD); Educational Plans and Desires (EDPLN); and Study Habits (HBTS). Together, these four indices are called the set of Family Process variables (PRCS), since they refer both to the expectations and aspirations that the students feel their parents hold for them and to the many activities that their parents engage in with them in support of these expectations and aspirations. The sets of both the Home Background and the Family Process indices were defined in chapter 1. Together they are known as Family Background (FB).

In the following analysis, the racial and ethnic groups are kept separate in order to see how they differ from one another. In later chapters, however, they are brought into a common framework so that the extent of their differences can be systematically assessed.

Our reasons for isolating these particular groups of indices are as follows. A number of investigators have focused on the structural aspects of the family. They have attempted to show how differences in the family's social and economic well-being, as contrasted with the presence or absence of parents or parental surrogates, have implications for the development of different attributes and behaviors in the children (McClelland, 1951; Rainwater, 1967). The problem, as they have defined it, resolves itself to this: Is it the socioeconomic status of the family or the presence or absence of key family members that plays the greater role in the development of the children's abilities? Or are family socioeconomic status and family disruption so closely intertwined that the effects of one cannot be separated from the effects of the other? Accordingly, the first question addressed in this chapter is: What are the relative roles played by the student's Socio-Economic Status and Family Structure and Stability in the development of Achievement? As our measure of achievement we will use the composite known as ACHV (p. 6).

A separate but related question is how the sets of Home Background variables (that is, SES and FSS) relate to ACHV when put in context with the sets of Family Process variables. Does HB or PRCS play the greater role in ACHV, or are they so closely intertwined that their effects cannot be separated? Accordingly, the second question addressed in this chapter is: What are the relative roles played by the student's Home Background and Family Process in the development of Achievement?

Since family disruption usually results in absence of the father, and since it has often been thought that this affects boys more than girls, boy-girl differences are also examined in connection with both questions. Table 2.1 shows the number of students sampled in the analysis, by sex and racial-ethnic group; all were from the ninth grade.

### 2.1.1. Correlates of Achievement

Correlations of ACHV with the individual variables to be used in the rest of the analysis are given in table 2.2 for each of the six racial-ethnic groups and for all groups combined. It will be seen from this table that SES correlates highest with ACHV for whites, with the values for Indian Americans, Mexican-Americans, Negroes, and Oriental-Americans about seven to 10 points lower. The value for Puerto Ricans is lower than for any other group, and the value for all groups combined is largest of all, reflecting (in part) the SES differences among the different groups.

The lower correlations for the nonwhite groups cannot readily be attributed to greater socioeconomic homogeneity. Actually, all six of them exhibit about the same degree of homogeneity, since their standard deviations are as follows: whites, 2.04; Oriental-Americans, 2.09; Negroes, 2.12; Mexican-Americans, 2.19; Puerto Ricans, 2.23; Indian Americans, 2.31; and total, 2.24. The whites, then, are actually more homogeneous than the nonwhites,

Table 2.1.—Number of 9th-Grade Students, by Racial-Ethnic Group and Sex

| | Racial-Ethnic Group | | | | | | |
|---|---|---|---|---|---|---|---|
| Sex | Indian | Mexican | Puerto Rican | Negro | Oriental | White | Total |
| Male | 1,544 | 3,391 | 1,904 | 18,089 | 872 | 39,000 | 64,800 |
| Female | 1,333 | 2,445 | 1,798 | 19,176 | 803 | 37,753 | 63,308 |
| Total | 2,877 | 5,836 | 3,702 | 37,265 | 1,675 | 76,753 | 128,108 |

Table 2.2.—Correlates of Achievement, by Racial-Ethnic Group

| | Racial-Ethnic Group | | | | | | |
|---|---|---|---|---|---|---|---|
| Variable Title | Indian | Mexican | Puerto Rican | Negro | Oriental | White | Total |
| Socio-Economic Status (SES) | 36 | 38 | 30 | 39 | 35 | 46 | 53 |
| Family Structure and Stability (FSS) | 25 | 33 | 25 | 16 | 36 | 20 | 31 |
| Expectations for Excellence (EXPTN) | 33 | 32 | 33 | 28 | 41 | 39 | 37 |
| Attitude Toward Life (ATTUD) | 37 | 41 | 39 | 38 | 40 | 41 | 46 |
| Educational Plans and Desires (EDPLN) | 41 | 44 | 43 | 42 | 56 | 53 | 49 |
| Study Habits (HBTS) | 28 | 31 | 32 | 23 | 28 | 33 | 34 |

NOTE.—The standard deviations of Achievement for each group are: Indian, 3.20; Mexican, 3.45; Puerto Rican, 3.34; Negro, 3.09; Oriental, 3.61; white, 3.27; and total, 3.67. All correlations have been rounded to two places of decimals and leading decimal points omitted.

and the increase in the standard deviation for the total group can be attributed, in the main, to the SES differences among the six groups. Thus there is a greater relationship between ACHV and SES for whites than for the other ethnic groups.

The relationship of FSS with ACHV is greatest for Oriental-Americans and Mexican-Americans, smaller for Indian Americans and Puerto Ricans, and smallest for Negroes and whites. It is hard to see why the smallest relationship should occur in two groups that are so different in their incidence of family disruption. About 82 percent of white homes have fathers present; the corresponding figure for Negro homes is 55 percent (Moynihan, 1968). The standard deviations of FSS for the different groups are: whites, 1.71; Oriental-Americans, 2.31; Negroes, 2.51; Mexican-Americans, 2.54; Indian Americans, 2.82; Puerto Ricans, 3.03, and total, 2.06. Thus, as with SES, these results cannot be attributed to greater group homogeneity among Negroes. Indeed, the standard deviations show that whites are the *least* variable of any racial-ethnic group in their FSS scores. Moreover, Indian Americans, Puerto Ricans, and Mexicans are all more variable than Negroes. That these relationships are not solely a function of variability in FSS is shown by the figures for the Orientals, who have the next-to-lowest standard deviation but the highest correlational value.

Can it be that differences in achievement among Negroes are less sensitive to differences in family structure, or that Negroes have developed ways of compensating for family disruption? This question will be addressed in various ways in this chapter and those that follow. It will be addressed not only for boys as compared with girls but for different regions of the country. The implications of differences between groups will also be examined.

For EXPTN the relationship with ACHV is greatest for Orientals and whites and smallest for Negroes; the intermediate groups are uniform in value. The correlations of ATTUD with ACHV are much closer in magnitude for the different groups than they were for the other variables—in fact, all the values are within four points of each other. For EDPLN the values are greatest for Orientals and whites; the other groups are some 12 to 15 points lower. For HBTS the correlations are greatest for whites, Mexican-Americans, and Puerto Ricans, smaller for Indian Americans and Oriental-Americans, and smallest for Negroes. In summary, then, for all these attitudinal and motivational measures the correlations with ACHV tend to be greater for Oriental-Americans and whites.

## 2.2. THE ROLE OF SOCIO-ECONOMIC STATUS COMPARED WITH THAT OF FAMILY STRUCTURE AND STABILITY

Figure 2.1 and table 2.3 present R-squares (squared multiple correlations) and commonality analyses, respectively, for the HB measures. The percentages shown in figure 2.1 were obtained by entering Home Background into the regression analysis first, and then entering Process. The shaded and the plain areas in each bar represent the roles of Home Background and Family Process combined, while the plain area represents the contribution of Process independent of Home Background. The statistical significance of the differences among these R-squares was tested by means of the procedure outlined in chapter 1 and appendix A.[1]

Inspection of R-squares for HB in figure 2.1 shows

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[1] In order to conserve computer time, only differences among totals were tested. These tests yielded $F$-values of 4 or more, which indicated that the groups differed enough to be kept separate for purposes of analysis. Results in the main body of each table are given in terms of unitized commonality analyses (as described in chapter 1). Since this unitizing operation divides out the differences in the R-squares, it allows one to compare directly the relative roles of the different sets of variables.

FIGURE 2.1. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY RACIAL-ETHNIC GROUP AND SEX

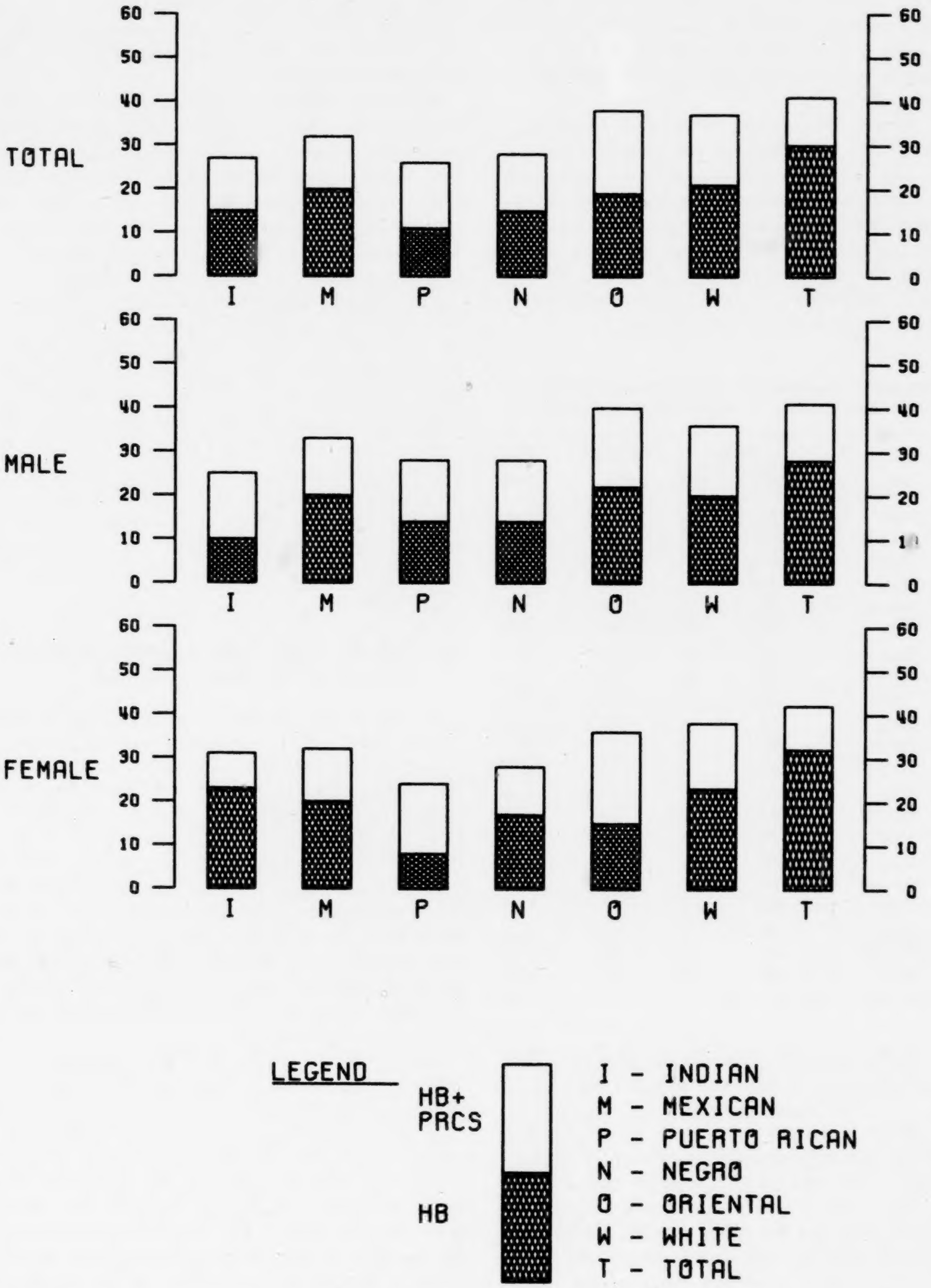


Figure 2.1 (5a)

that there are substantial group differences in the extent to which ACHV can be explained by it, that is, by SES and FSS combined. The *T*-values (*T* stands for total) show that ACHV is more fully explained by these measures for whites, Mexican-Americans, and Oriental-Americans. The Indian Americans and Negroes are about 4 to 6 points lower, and the Puerto Ricans lowest of all. When all groups are combined, ACHV is more fully explained than for any individual group. As noted earlier for individual variables, this increase is due in part to the differences among the six groups.

What, then, of sex differences? When the shaded portions of figure 2.1 are examined for the different groups, it will be seen that there are differences in the R-squares for all groups except the Mexican-Americans. The differences are greatest for the Indians. The extent of explanation is greatest for female Indians, Negroes, and whites, and male Puerto Ricans and Oriental-Americans. For all groups combined, the percent of ACHV explained is about 4 percent greater for males than for females.

**Table 2.3.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Racial-Ethnic Group and Sex**

| Group | Sex | Unique SES | Unique FSS | Common | SES/FSS |
|---|---|---|---|---|---|
| Indian | Male | 43 | 28 | 29 | 1.5 |
| | Female | 72 | 5 | 23 | 14.4 |
| | Total | 60 | 14 | 26 | 4.3 |
| Mexican | Male | 38 | 33 | 29 | 1.2 |
| | Female | 56 | 16 | 28 | 3.5 |
| | Total | 45 | 26 | 29 | 1.7 |
| Puerto Rican | Male | 51 | 21 | 28 | 2.4 |
| | Female | 42 | 23 | 35 | 1.8 |
| | Total | 47 | 22 | 31 | 2.1 |
| Negro | Male | 79 | 3 | 18 | 26.3 |
| | Female | 86 | 2 | 12 | 43.0 |
| | Total | 83 | 2 | 15 | 41.5 |
| Oriental | Male | 30 | 35 | 35 | .9 |
| | Female | 36 | 39 | 25 | .9 |
| | Total | 32 | 37 | 31 | .9 |
| White | Male | 79 | 2 | 19 | 39.5 |
| | Female | 85 | 1 | 14 | 85.0 |
| | Total | 82 | 2 | 16 | 41.0 |
| Total | Male | 66 | 6 | 28 | 11.0 |
| | Female | 71 | 4 | 25 | 17.8 |
| | Total | 68 | 5 | 27 | 13.6 |

Table 2.3 exhibits differences in the commonality analyses for these variables. Some very marked differences are apparent, even for Mexican-Americans. Among the totals for the different groups, the values for whites and Negroes stand out as being remarkably different. For these two groups, the unique role of SES exceeds that of FSS by a factor of about 41 to 1. The common portions, too, are much smaller than for the other groups, which suggests that SES and FSS are less closely associated in the way they relate to ACHV. For the other group totals, SES still plays a greater role than FSS, except in the case of Orientals, for whom FSS plays a slightly greater role than SES. The role of SES exceeds that of FSS by a factor of about 4 to 1 for Indians, but by a factor of only 2 to 1 for Puerto Ricans and Mexican-Americans. For Oriental-Americans, the relative roles are more nearly on an equal footing. The larger common portions for these latter groups (Indians, Mexican-Americans, Puerto Ricans, and Oriental-Americans) also suggest that the interplay of SES and FSS in the development of ACHV may be greater for them.

When sex differences are examined for each group, it will be noted that for some groups these differences are very slight, whereas for others they are quite pronounced. For Negroes and whites, there is a slight tendency for FSS to play a greater role for males than for females, and for SES to play a greater role for females than for males. Differences for the other groups are more pronounced, but they do not always follow this same pattern.

By way of summarizing these sex differences we can note the factor by which the role of SES exceeds FSS for each sex group. For Indians, the factor is about 1.5 for males and 14.0 for females; for Mexican-Americans it is about 1.0 for males and 3.5 for females; for Puerto Ricans, it is about 2.4 for males and 1.8 for females; for Oriental-Americans, it is about 0.9 for both sexes, which indicates that FSS has a slightly greater role than SES; for Negroes it is about 26.0 for males and about 43.0 for females; and for whites it is about 40.0 for males and 85.0 for females. These values show the dramatic extent to which the role of SES exceeds that of FSS for Negroes and whites.

## 2.3. THE ROLE OF HOME BACKGROUND COMPARED WITH THAT OF FAMILY PROCESS

In this section the following question is asked: Which set of factors, HB or PRCS, plays a greater role in the development of ACHV? The question is a crucial one. If HB plays a greater role than PRCS, then the structural aspects of the family may be more important. Or, alternatively, if the role of PRCS is found to be greater, then the motivational aspects of the student and his family may be more important than the structural aspects. But if the expectations and aspirations that a family has for its children are highly dependent upon the family's structure, stability, and socioeconomic status, then the roles of Home Background and Family Process will be inseparable. How, then, do these different aspects of the family relate to Achievement?

The extent to which ACHV is explained by PRCS is indicated by the R-squares for FB in figure 2.1, above (the plain and shaded areas combined). In every case, they are substantially larger than for HB alone. In other words, when the PRCS measures are entered into the regression analysis with the HB measures, they are far more effective in explaining ACHV. This increase in effectiveness is greatest for Oriental-Americans and whites; the increase for the other groups is lower and differs very little by group. When we look at the absolute values of the R-squares for FB by group, we note that the groups with the highest values are whites and Oriental-Americans. Mexican-Americans are next highest; lowest are Negroes, Indians, and Puerto Ricans, all close to each other. Largest of all is the total R-square; as with the earlier values, this reflects both the differences within groups and the differences among them.

When sex differences are examined, it will be seen that the increase in R-square that is attributable to PRCS tends to be greatest for males (the exceptions are Oriental-Americans and Puerto Ricans). When the absolute values of the R-squares are examined by sex, it appears that for Mexican-Americans, Negroes, and whites, as well as for all groups combined, the sex group values are similar, if not identical, to those for their respective group totals. The greatest sex differences are displayed by Indians, Puerto Ricans and Oriental-Americans. For males and females in each group as well as for the group totals, the highest R-squares are for Orientals and whites.

**Table 2.4.—Commonality Analyses of Home Background and Process, by Racial-Ethnic Group and Sex**

| Group | Sex | Unique |  | Common | PRCS |
|---|---|---|---|---|---|
|  |  | HB | PRCS |  | HB |
| Indian | Male | 6 | 60 | 34 | 10.0 |
|  | Female | 27 | 25 | 48 | .9 |
|  | Total | 14 | 43 | 43 | 3.1 |
| Mexican | Male | 16 | 41 | 43 | 2.6 |
|  | Female | 19 | 36 | 45 | 1.9 |
|  | Total | 17 | 39 | 44 | 2.3 |
| Puerto Rican | Male | 8 | 48 | 44 | 6.0 |
|  | Female | 2 | 65 | 33 | 32.5 |
|  | Total | 5 | 55 | 40 | 11.0 |
| Negro | Male | 16 | 48 | 36 | 3.0 |
|  | Female | 23 | 41 | 36 | 1.8 |
|  | Total | 20 | 45 | 35 | 2.3 |
| Oriental | Male | 11 | 44 | 45 | 4.0 |
|  | Female | 4 | 58 | 38 | 14.5 |
|  | Total | 8 | 49 | 43 | 6.1 |
| White | Male | 7 | 44 | 49 | 6.3 |
|  | Female | 12 | 41 | 47 | 3.4 |
|  | Total | 10 | 43 | 47 | 4.3 |
| Total | Male | 15 | 32 | 53 | 2.1 |
|  | Female | 26 | 25 | 49 | .9 |
|  | Total | 20 | 28 | 52 | 1.4 |

Which, then, is the more influential set of factors? The commonality analyses in table 2.4 show that for each group the role uniquely attributable to PRCS dramatically exceeds or outweighs that attributable to HB. This is true for each individual sex group as well as for each group total. For all groups combined, however, the effect is not as pronounced. When differences among the groups are entered into the analysis they tend to increase the magnitude of the common role as well as the role played by HB.

There are some interesting group differences in the extent to which the role of PRCS exceeds that of HB. For Puerto Ricans it does so by a factor of about 11 to 1. For Oriental-Americans it does so by a factor of 6 to 1, and for whites by a factor of 4 to 1. For the remaining groups, the factors are as follows: Indians, 3 to 1; Negroes 2 to 1; and Mexican-Americans, 2 to 1. For all groups combined, the factor is smallest of all, being about 1.4 to 1.

When sex differences are examined, the range of variation increases. For groups other than Puerto Ricans and Oriental-Americans, the role of HB is always greater for females than for males, while the role of PRCS is greater for males than for females. For Puerto Ricans and Oriental-Americans, however, the opposite is true.

Variation in the extent to which PRCS exceeds HB can also be compared for the different sex groups. For Indians these comparisons show that the role of PRCS exceeds that of HB by a factor of about 10 to 1 for males. For females, however, the effect is reversed, though the factor is only slightly less than 1. For Mexican-Americans, the factor was more than 2 to 1 for males and slightly less than that for females. Huge sex differences can be noted for Puerto Ricans: the role of PRCS exceeds that of HB by about 6 to 1 for males and 32 to 1 for females. Sex differences are also pronounced for Oriental-Americans: the corresponding figures are 4 to 1 for males and 14 to 1 for females. For Negroes, however, they are only 3 to 1 for males and almost 2 to 1 for females. Whites also exhibit moderate sex differences—about 6 to 1 for males and 3 to 1 for females. But for all groups combined, these factors change considerably. For total males, the role of PRCS exceeds that of HB by a factor of about 2 to 1, whereas for females the value is more nearly 1 to 1. Clearly, the dominant trend is in favor of PRCS—often dramatically so.

### 2.3.1. The Role of Educational Plans and Desires Compared With That of Other Motivational Factors

If Family Process is the dominant set, which aspects of it play the greatest role in Achievement? How is a student's achievement level related to his plans for further schooling and aspirations for a higher ranking occupation? In our analysis the role of the student variable known as Educational Plans and Desires, which measures the student's long-term aspirations, is compared with that of the following short-term motivational factors:

1. The expectations that he and his parents have for his school performance (Expectations for Excellence).
2. His outlook on life as to how important he considers hard work for success, and how he thinks an education will benefit him (Attitude Toward Life).
3. The extent to which he engages in various intellectual activities such as reading books, doing homework, watching television, and discussing his school work with his parents (Study Habits).

Since home background conditions may also have an influence on Educational Plans and Desires (EDPLN) and Achievement (ACHV) (viz, the more affluent families are more financially able to send their children on to college), the latter was first adjusted for differences in Home Background (HB) by means of partial correlation techniques. Consequently, the differences among students in ACHV that are being analyzed here are those that are independent of or at least uncorrelated with HB. In figure 2.1 these differences were represented by the unshaded portions of the bar chart.

Table 2.5.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Racial-Ethnic Group and Sex, Adjusted for Differences in Home Background

| Group | Sex | Unique | | Common | MTVTN |
|---|---|---|---|---|---|
| | | EDPLN | MTVTN | | EDPLN |
| Indian | Male | 32 | 29 | 39 | .9 |
| | Female | 14 | 55 | 31 | 3.9 |
| | Total | 24 | 40 | 36 | 1.7 |
| Mexican | Male | 30 | 35 | 35 | 1.2 |
| | Female | 17 | 53 | 30 | 3.1 |
| | Total | 25 | 42 | 33 | 1.7 |
| Puerto Rican | Male | 32 | 24 | 44 | .8 |
| | Female | 15 | 45 | 40 | 3.0 |
| | Total | 24 | 33 | 43 | 1.4 |
| Negro | Male | 29 | 30 | 41 | 1.0 |
| | Female | 23 | 42 | 35 | 1.8 |
| | Total | 26 | 35 | 39 | 1.3 |
| Oriental | Male | 57 | 19 | 24 | .3 |
| | Female | 39 | 26 | 35 | .7 |
| | Total | 49 | 19 | 32 | .4 |
| White | Male | 32 | 23 | 45 | .7 |
| | Female | 24 | 34 | 42 | 1.4 |
| | Total | 27 | 30 | 43 | 1.1 |
| Total | Male | 28 | 33 | 39 | 1.2 |
| | Female | 14 | 53 | 33 | 3.8 |
| | Total | 21 | 43 | 36 | 2.0 |

The resulting commonality analyses are presented in table 2.5. Here, differences in the R-squares for each group have been divided out, that is, HB has been partialed out of ACHV. Educational Plans and Desires are called EDPLN, while the three short-term motivational factors are called MTVTN. Inspection of this table shows that for each group there is a fairly substantial percentage in common with each of these two sets of variables. In other words, there is a good deal of each set involved in the other as they relate to ACHV.

The unique percentages, however, offer some interesting similarities and differences. When the totals are examined for each of the racial-ethnic groups it will be seen that the role of MTVTN is greater than that of EDPLN for all groups except the Orientals. This is also evident from the extreme right-hand column, which lists the extent to which the role of MTVTN exceeds that of EDPLN. Except for "Total Orientals," this factor is always greater than one and at times approaches twice the value of EDPLN. For Oriental-Americans EDPLN exceeds MTVTN by a factor of about 2.5 to 1.

When sex differences are taken into account, however, some marked differences appear. For every one of the groups, the role of EDPLN is much greater for males than for females. In addition, for all males except Negroes and Mexican-Americans the role of EDPLN exceeds that of MTVTN, as can be seen from the ratios in the right-hand column that are less than 1. For Negro males the relative roles of EDPLN and MTVTN are approximately equal, while for Mexicans the role of MTVTN exceeds that of EDPLN. For all females except Oriental-Americans, the role of MTVTN in ACHV is substantially greater than that of EDPLN—at times approaching a factor of almost four times greater. In summary, EDPLN plays a greater role in ACHV for males than for females, while MTVTN plays a much greater role for females than for males.

## 2.4. RACIAL-ETHNIC GROUP DIFFERENCES IN AVERAGE ACHIEVEMMENT

A question often posed is: How much do racial-ethnic groups differ in their achievement levels? Or how much is one group behind the others? The latter question assumes the existence of the so-called achievement gap—a gap that we expect the educational system to fill by placing these groups, upon leaving school, in a comparable position with regard to the salability of their skills in the marketplace.

Table 2.6.—Average Achievement, by Racial-Ethnic Group and Sex

| | Total | Male | Female |
|---|---|---|---|
| Indian | 44.93 | 44.86 | 45.00 |
| Mexican | 43.71 | 43.38 | 44.15 |
| Puerto Rican | 40.86 | 40.54 | 41.24 |
| Negro | 41.67 | 41.52 | 41.81 |
| Oriental | 51.13 | 50.88 | 51.43 |
| White | 52.81 | 52.38 | 53.25 |
| Total | [a] 50.00 | 49.63 | 50.39 |

[a] All group means are expressed in terms of the grand total mean of 50 and standard deviation of 10.

Table 2.6 presents the group means standardized in terms of a distribution with a mean of 50 and a standard deviation of 10; the base data were those for all ninth-grade students. It is apparent from inspection of this table that the really large differences exist only among the different racial-ethnic groups. True, within each group the values for females are uniformly higher than for males. But these differences are rather small. Differences among the group totals, however, are quite large. Whites are highest; Oriental-Americans are about 1.7 points behind them. The other groups all cluster together about 8 to 12 points behind the whites. In interpreting these latter differences one must recall that these are ninth-grade students. Accordingly, one of the reasons why some nonwhite groups score higher than others may be that some of their lower achieving students have dropped out before reaching the ninth grade. For example, the dropout rate for Indian and Mexican-American children is high even in the early years of schooling. Overall, ACHV is highest for whites. Oriental-Americans lag them by about .2 of a standard deviation, and the other groups by about .8 to 1.2 standard deviations. Females have uniformly higher averages than males, but only by less than .1 of a standard deviation.

## 2.5. SUMMARY

This chapter investigated the following two questions:

1. What are the relative roles played by family Socio-Economic Status (SES) and Family Structure and Stability (FSS) as they relate to Achievement (ACHV)?

2. What role does HB (that is, SES plus FSS) play in the development of ACHV when put in context with

the aspirations and expectations that students feel their parents have for them, and the activities that they engage in with them in support of these aspirations? This latter set of variables was called Family Process (PRCS). It included Expectations for Excellence (EXPTN), Attitude Toward Life (ATTUD), Educational Plans (EDPLN), and Study Habits (HBTS).

Correlations of each of the individual variables in these sets with ACHV were first inspected for each of the seven groups: Indian Americans, Mexican-Americans, Puerto Ricans, Negroes, Oriental-Americans, whites, and all groups combined. These correlations showed that:

1. There was a greater relationship between ACHV and SES for whites than for other ethnic groups.

2. The correlation of FSS with ACHV was highest for Oriental-Americans and Mexican-Americans, next-to-highest for Indians and Puerto Ricans, and lowest for Negroes and whites.

3. For the four PRCS measures, correlations with ACHV tended to be greatest for Oriental-Americans and whites.

Family disruption is usually associated with the absence of the father. Since this may have greater consequences for boys than for girls, it was decided to investigate boy-girl differences in this area. But first comparisons were made of the extent to which ACHV was explained for the different groups. In this way it was hoped to indicate the extent to which these variables were involved with ACHV. These differences were then eliminated so that comparisons of the relative percentages across groups could be made.

Examination of the extent to which ACHV was explained by the HB measures showed that ACHV was more fully explained for whites, Oriental-Americans, and Mexican-Americans. Indian Americans and Negroes were next lowest, and Puerto Ricans lowest of all. When sex differences within each group were examined, it was found that ACHV was more fully explained by HB for female Indians, Negroes, and whites, and for Puerto Ricans and Oriental-Americans.

The results of commonality analyses for the different groups can be expressed by dividing the percentage for SES by that for FSS as shown below.

| Group | Total | Male | Female |
|---|---|---|---|
| Indian American | 4.3 | 1.5 | 14.4 |
| Mexican-American | 1.7 | 1.2 | 3.5 |
| Puerto Rican | 2.1 | 2.4 | 1.8 |
| Negro | 41.5 | 26.3 | 43.0 |
| Oriental-American | .9 | .9 | .9 |
| White | 41.0 | 39.5 | 85.0 |
| Total | 13.6 | 11.0 | 17.8 |

When a ratio is greater than 1.0, the role of SES exceeds that of FSS. When the ratio is near 1.0 the relative roles are more nearly equal; when it is less than 1.0 the role of FSS exceeds that of SES. These ratios show that the role of SES is dramatically greater than that of FSS for whites and Negroes. The same is true for Indians, Puerto Ricans, and Mexican-Americans, but to a much lesser extent. Only for Oriental-Americans does the role of FSS exceed that of SES. The extent to which SES exceeds FSS is greater for females than males for Indians, Mexican-Americans, Negroes, and whites. Only for Puerto Ricans does SES have a greater role for males than for females.

The second question dealt with the role of the HB measures when combined with the PRCS measures. The level of explanation of ACHV was increased substantially for all groups when the PRCS set was brought into the analysis with HB. For these combined measures, the level was highest for whites and Oriental-Americans; it was next highest for Mexican-Americans, and lowest for Negroes, Puerto Ricans, and Indians. Few or no sex differences were found in the level of explanation for Mexican-Americans, Negroes, and whites; the greatest differences were found for Indians, Puerto Ricans, and Oriental-Americans. Overall, however, the level of explanation was highest for whites and Orientals.

Analyses of the relative roles of the HB and PRCS sets showed that the role of PRCS was almost always greater than that of HB, and often quite dramatically so. The extent of this departure is indicated by the following ratios of the percentage value for PRCS divided by that for HB.

| Group | Total | Male | Female |
|---|---|---|---|
| Indian American | 3.1 | 10.0 | .9 |
| Mexican-American | 2.3 | 2.6 | 1.9 |
| Puerto Rican | 11.0 | 6.0 | 32.5 |
| Negro | 2.3 | 3.0 | 1.8 |
| Oriental-American | 6.1 | 4.0 | 14.5 |
| White | 4.3 | 6.3 | 3.4 |
| Total | 1.4 | 2.1 | .9 |

The above ratios show that the role of PRCS variables almost always exceeds that of HB. It is most pronounced for Puerto Ricans, and least pronounced when all groups are combined. Some striking sex differences can also be noted, especially for Indians and Puerto Ricans. The trend is for PRCS to exceed HB to a greater extent for male than for female Indians, Mexican-Americans, Negroes, and whites, and for female rather than for male Puerto Ricans and Oriental-Americans. The dominant trend, however, is for the role of PRCS to exceed that of HB.

In order to give an indication of the relative contributions of EDPLN and MTVTN, the relative roles of these two sets were examined after first equating students' ACHV for differences in their HB. This latter adjustment was made because more favorable HB conditions are often involved in the development of plans for further schooling. When the relative roles of these variables were examined it was found that there was an overlap of 30–40 percent of the two sets as they related to ACHV. The most striking result, however, was for EDPLN to have a much larger role than MTVTN in ACHV for males than for females. Similarly, MTVTN played a much greater role for females than for males.

Differences in the average ACHV for the groups were compared. These comparisons showed that there were small but uniform sex differences for each group: females exceeded males by about one-tenth of a standard deviation. The quite large differences were between the group totals. Whites were highest, and Oriental-Americans next to highest by about two-tenths of a standard deviation.

Finally, this chapter has shown that, except for Orientals, the role of SES in ACHV is greater than that of FSS. This is especially true of whites and Negroes. Just why there should be marked similarities for these two groups when they are so different in their incidence of family disruption is a question that will be addressed in the next chapter. Finally, it was observed that the role of the set of variables known as PRCS tends to exceed that of the set of variables known as HB. When the PRCS variables were examined to determine those that might be playing the greatest role in ACHV, pronounced sex differences were observed. In particular, the longer range educational plans and aspirations played a greater role in ACHV for males than for females.

## Chapter 3

# THE ROLE OF GEOGRAPHIC RESIDENCE

This chapter explores the manner in which the relative roles of the different family background variables in the development of the student's abilities change by virtue of his or her geographic residence. The four geographic groupings used in this analysis were: nonmetropolitan North; metropolitan North; nonmetropolitan South; and metropolitan South. Definitions of these groupings, together with the detailed analyses upon which the present chapter is based, will be found below in appendix B.

The questions for which answers were sought were:

1. How do the relative roles of Socio-Economic Status (SES) and Family Structure and Stability (FSS) differ in each geographic area?
2. How do the relative roles of Home Background (HB) and Process (PRCS) differ for these same areas?
3. What is the magnitude of the role played by Educational Plans (EDPLN) and the other components of Process in each area after students have been equated for differences in Home Background?
4. How does mean Achievement (ACHV) differ from one area to another?

These questions were addressed for each of the six racial-ethnic groups, and for differences between the sexes within each racial-ethnic group (the sets of variables used were fully described on pp. 6–8). First, however, it was necessary to make the results for each separate group more comparable by eliminating differences between them in the extent to which ACHV was explained by the various sets of variables. These differences are important to us because they indicate the extent to which ACHV is more fully explained or more dependent upon these variables for some groups than for others. We eliminate these differences because we are interested in the explanatory role of one set *relative* to another set.

## 3.1. HOW DOES THE DEPENDENCE OF ACHIEVEMENT ON FAMILY BACKGROUND VARY BY GEOGRAPHIC AREA?

The percentage of variation (that is, the R-squares) explained by the six family background variables (that is, HB plus PRCS) for each geographic region is summarized in table 3.1. Inspection of this table shows that the values tend to be larger in the South than in the North for Indians, Mexican-Americans, and Puerto Ricans. For Negroes and whites the regional values tend to be closer together in magnitude. The largest value for Negroes occurs in the nonmetropolitan North, while for whites it occurs in the metropolitan South.

For Oriental-Americans it was necessary to use a somewhat different mode of classification. This was necessary because most of them were found to be concentrated in the mid-Atlantic and Far Western regions, both of which form part of the North in the classification used for the other racial-ethnic groups. Consequently, for Oriental-Americans the mid-Atlantic metropolitan and Far Western metropolitan and nonmetropolitan regions were used as geographic regions (there were not enough of them in the mid-Atlantic nonmetropolitan area to support analyses). The results show that, for Oriental-Americans, ACHV is more dependent upon these family background measures in the Far West (particularly the nonmetropolitan portion) than in the mid-Atlantic.

Table 3.1.—Summary of Percent of Variation in Achievement Explained from Family Background Measures, by Geographic Location, Sex, and Racial-Ethnic Group

| Group | Geographic Location | | | | Sex |
|---|---|---|---|---|---|
| | North | | South | | |
| | Nonmet | Met | Nonmet | Met | |
| Indian | 24 | 26 | 35 | 40 | F>M |
| Mexican | 29 | 28 | 31 | 46 | Region |
| Puerto Rican | 17 | 27 | 37 | 33 | F>M |
| Negro | 32 | 26 | 28 | 27 | F>M |
| White | 38 | 37 | 39 | 33 | F>M |
| | Mid-Atlantic | | Far West | | |
| | Nonmet | Met | Nonmet | Met | |
| Oriental | ([a]) | 32 | 41 | 34 | M>F |

[a] Sample too small for analysis.

The column in tables 3.1 labeled "Sex" attempts to summarize the regularities in differences between males and females when all the geographic groups are compared for each racial-ethnic category. For example, if the percentages were larger for females than for males in three or more of the geographic groups then ACHV was judged to be more fully explained for females than for males and this was indicated by the inequality F>M in the "Sex" column. A similar rationale was followed for males. Inspection of this column in table 3.1 shows that for four of the six groups there is a greater dependence of ACHV on the family background measures for females than for males. For Oriental-Americans the reverse is true. For Mexican-Americans, females exceed males in the North but the reverse occurs in the South.

## 3.2. HOW DO THE RELATIVE ROLES OF SOCIO-ECONOMIC STATUS AND FAMILY STRUCTURE AND STABILITY IN ACHIEVEMENT DIFFER BY GEOGRAPHIC AREA?

The next step was to analyze the relative roles of SES and FSS. But first, in order to make the various groups comparable, the results of the commonality analyses were unitized. This was done by dividing the result for each group by the percent of variation in ACHV explained by these two variables. Further, in order to reduce the sheer mass of numerical material to be presented, the percentage role attributable to SES was divided by that attributable to FSS. When the ratio so obtained is greater than one it indicates that the role of SES exceeds that of FSS —the larger the ratio, the greater the role. When the ratio is equal to one it indicates that their roles are about equal. When the ratio is less than one it indicates that the role of FS exceeds that of SES—the smaller the ratio, the greater the role.

**Table 3.2.—Summary of the Relative Roles of Socio-Economic Status and Family Structure, by Geographic Location, Sex, and Racial-Ethnic Group Membership**

| | Geographic Location SES/FSS | | | | |
|---|---|---|---|---|---|
| | North | | South | | |
| Group | Nonmet | Met | Nonmet | Met | Sex |
| Indian | 9.20 | 2.40 | 10.80 | 1.10 | F>M |
| Mexican | .60 | 1.40 | 2.20 | 1.60 | F>M |
| Puerto Rican | .04 | 4.70 | 1.50 | 9.30 | M>F |
| Negro | 29.30 | 6.90 | 14.0 | 86.0 | Region |
| White | 41.0 | 25.7 | 88.0 | 84.0 | F>M |
| | Mid-Atlantic | | Far West | | |
| | Nonmet | Met | Nonmet | Met | |
| Oriental | (a) | .31 | 4.53 | .97 | F>M |

[a] Sample too small for analysis.

These ratios are summarized for the different groups in table 3.2. Inspection of this table shows that the role of SES exceeds that of FSS for nearly all groups. The exceptions are for Mexican-Americans and Puerto Ricans in the nonmetropolitan North and for Oriental-Americans in the metropolitan areas. The extent to which SES exceeds FSS is especially pronounced for whites and Negroes. For the other groups, it varies with the geographic area, being greater in the nonmetropolitan areas for Indians and in the metropolitan areas for Puerto Ricans. Pronounced also is the extent to which FSS exceeds SES for Puerto Ricans and Mexicans in the nonmetropolitan North and for Oriental-Americans in the metropolitan mid-Atlantic.

The sex column shows that for Indians, Mexicans, whites, and Orientals the ratio was larger for females than for males. For Puerto Ricans, however, it was larger for males than for females. The entry "Region" for Negroes indicates that the ratio depended upon the region being greater for males in the North and for females in the South.

## 3.3. HOW DO THE RELATIVE ROLES OF HOME BACKGROUND AND PROCESS IN ACHIEVEMENT DIFFER FOR THE VARIOUS GROUPS?

We turn now to the roles played by the two HB variables (that is, SES and FSS) when juxtaposed with the set of measures called PRCS (that is, EXPTN, ATTUD, EDPLN, and HBTS). The same kind of adjustment was made as before. In order to form the ratios given in table 3.3 the percentage role for PRCS was divided by that for HB.

Inspection of table 3.3 shows that for all racial-ethnic groups in all regions the role of PRCS substantially exceeds that of HB. For some groups these ratios show a greater variability between regions as well as larger values. For example, the largest ratio obtained is for Puerto Ricans in the nonmetropolitan North. Puerto Ricans also have the greatest range of values between regions—from 23.3 in the nonmetropolitan North to 1.4 in the metropolitan South. This range is next largest for Indians, whites, and Oriental-Americans, and smallest for Mexican-Americans and Negroes. The "Sex" column serves the same function as before. Inspection of this column shows that the ratio of HB to PRCS is larger for male than for female Indians, Mexicans, Negroes, and whites. For Orientals, in two out of the three regions, the ratio is larger for females than for males. For Puerto Ricans sex differences depend upon region, being greater for males than for females in the nonmetropolitan North and metropolitan South, but greater for females elsewhere.

**Table 3.3.—Summary of the Relative Roles of Home Background and Process, by Geographic Location, Sex, and Racial-Ethnic Group**

| | Geographic Location PRCS/HB | | | | |
|---|---|---|---|---|---|
| | North | | South | | |
| Group | Nonmet | Met | Nonmet | Met | Sex |
| Indian | 4.4 | 5.7 | 2.4 | 1.1 | F>M |
| Mexican | 2.1 | 3.8 | 1.2 | 2.3 | M>F |
| Puerto Rican | 23.3 | 14.5 | 4.3 | 1.4 | Region |
| Negro | 2.5 | 4.8 | 2.9 | 3.3 | M>F |
| White | 8.5 | 4.8 | 5.1 | 3.8 | M>F |
| | Mid-Atlantic | | Far West | | |
| | Nonmet | Met | Nonmet | Met | |
| Oriental | (a) | 6.1 | 9.4 | 4.2 | F>M |

[a] Sample too small for analysis.

## 3.4. WHAT IS THE MAGNITUDE OF THE ROLE PLAYED BY EDUCATIONAL PLANS AND THE OTHER COMPONENTS OF PROCESS IN EACH AREA AFTER STUDENTS HAVE BEEN EQUATED FOR DIFFERENCES IN HOME BACKGROUND?

The third major question studied was what the role of EDPLN and the other PRCS measures (called MTVTN) were with ACHV. First, differences in ACHV attributable to the HB measures were taken out or adjusted for. The HB measures were taken to represent the affluence of the family. Ratios consisting of the role of MTVTN divided by that of EDPLN were then computed; they are summarized in table 3.4. It is clear from table 3.4 that for most groups the role of MTVTN exceeds that of EDPLN. Exceptions occur for Puerto Ricans in the South as a whole, Indian Americans in the metropolitan South, whites and Negroes in the metropolitan South, and Oriental-Americans in the Far West. For all of these latter groups the role of EDPLN exceeds that of MTVTN. Inspection of the sex column shows that the role of MTVTN exceeds that of EDPLN to a greater extent for females than for males.

Table 3.4.—Summary of the Relative Roles of Educational Plans and Other Motivational Measures, by Geographic Location, Sex, and Racial-Ethnic Group

| | Geographic Location MTVTN/EDPLN | | | | |
|---|---|---|---|---|---|
| | North | | South | | |
| Group | Nonmet | Met | Nonmet | Met | Sex |
| Indian | 2.0 | 2.4 | .8 | 1.9 | F>M |
| Mexican | 2.6 | 1.0 | 3.5 | 1.8 | F>M |
| Puerto Rican | 4.9 | 2.8 | .6 | .2 | F>M |
| Negro | 1.2 | 1.6 | 1.4 | .9 | F>M |
| White | 1.1 | 1.3 | 1.2 | .8 | F>M |
| | Mid-Atlantic | | Far West | | |
| | Nonmet | Met | Nonmet | Met | |
| Oriental | (a) | 2.2 | .6 | .4 | F>M |

[a] Sample too small for analysis.

## 3.5. HOW DOES MEAN ACHIEVEMENT DIFFER FROM ONE AREA TO ANOTHER?

Finally, we wanted to know how mean ACHV differed for each racial-ethnic group between geographic areas and by sex within each geographic area. In order to summarize the analytic results for this question, three kinds of figures were computed. All of them involved deviations from a mean, and were therefore expressed in terms of standard deviation, or sigma units—*s*-gaps for short. They were:

1. *The white-other s-gap within each region.* This figure was computed by subtracting the mean of all other racial-ethnic groups from the mean of the white group within each region, and dividing by the standard deviation of the distribution of ACHV scores for all students. For example, in table 3.5 the value of .8 for Indian Americans in the nonmetropolitan North was obtained by subtracting their mean score of 44.63 from the corresponding regional mean of 52.81 for whites, dividing this difference by 10 (which is the standard deviation for all students), and then rounding to one decimal place. Since the algebraic sign is always negative for each group it is not included in the table.

2. *Maximum within-region sex gap.* Within each region the difference between the scores for males and females was divided by the standard deviation of the distribution of scores for all students. (In order to facilitate comparison within and between regions and racial-ethnic groups, a common distribution was used for these as well as for the other measures described here.) The largest of these values for the various regional groups was selected as the maximum within-region sex gap for the whole of that racial-ethnic group. If the mean for females exceeded that for males for three or more of the geographic groups, this was indicated by "F>M." If three of the four geographic groups failed to show a consistent difference favoring either males or females the entry "Region" was made in order to indicate a regional dependence. These entries are given in the sex column of table 3.5.

Table 3.5.—Summary of Differences in Average Achievement, by Geographic Location, Sex, and Racial-Ethnic Group

| | Geographic Location | | | | | |
|---|---|---|---|---|---|---|
| | North | | South | | | |
| Group | Nonmet | Met | Nonmet | Met | Sex | Region |
| Indian | .8 | .8 | .7 | .7 | .2 Region | .5 |
| Mexican | .9 | 1.0 | .9 | .8 | .2 F>M | .3 |
| Puerto Rican | 1.3 | 1.2 | 1.4 | 1.5 | .4 F>M | .6 |
| Negro | 1.0 | 1.0 | 1.3 | 1.1 | .1 Region | .6 |
| White[a] | .1 | 0 | .4 | .2 | .1 F>M | .4 |
| | Mid-Atlantic | | Far West | | | |
| | Nonmet | Met | Nonmet | Met | | |
| Oriental | (b) | .5 | .1 | .1 | .3 F>M | .6 |

[a] The deviations for whites are taken from their highest mean value, which occurred in the metropolitan North. The deviations for Oriental-Americans are taken from the northern metropolitan or nonmetropolitan values for whites, as appropriate. To facilitate comparisons within and between regional and racial-ethnic groups a common distribution is used for all *s*-gap measures.

[b] Sample too small for analysis.

3. *Maximum between-region gap.* This figure was obtained by selecting the maximum difference between means for all regional groups, dividing it by the standard deviation, and rounding to one decimal place. This maximum difference could have been between males in one area and males in another, females in one area and females in another, or the group total for one area as compared with that for another. This value is given in the column labeled "Region" in table 3.5.

With regard to the *s*-gap within each region between whites and nonwhites, table 3.5 shows that for Indians and Mexicans it is least in the South, whereas for Puerto Ricans and Negroes it is least in the North and for Orientals in the Far West. The figures for whites were computed by taking deviations from their largest mean, which occurred in the metropolitan North. The *s*-gap for whites, then, is greatest in the nonmetropolitan South and least in the nonmetropolitan North.

The "Sex" column in table 3.5 shows that the largest sex gap values were for Puerto Ricans and Orientals, and the smallest for Negroes and whites. The inequalities show that, except for Indians and Negroes, females scored higher than males.

The last column in table 3.5 gives the maximum difference in standard deviation units that occurs between regions for each racial-ethnic group. These values show that the gap in Achievement between regions runs from largest to smallest as follows: Negroes, Orientals, Puerto Ricans, Indians, whites and Mexicans. For the first three groups, the size of the gaps is nearly equal.

This chapter has tended to emphasize regularities in the results obtained for the different geographic areas. However, another question that can be posed is whether or not there are systematic differences between the geographic groups that can be related to differences in the results obtained for each region. This latter question is dealt with on pp. 33–34, after presentation of further data on the relative status of different groups within and between regions.

## 3.6. SUMMARY

Analyses in this chapter have shown that:

1. ACHV was more dependent upon family background in the South for Indians, Mexican-Americans, and Puerto Ricans, in the North for Negroes and whites, and in the Far West for Oriental-Americans.

2. ACHV was more dependent upon family background for females than for males, except for Oriental-Americans for whom the opposite was the case.

3. The role of SES tended to be much greater relative to that of FSS for most geographic and racial-ethnic groups except Oriental-Americans, for whom the opposite was true in most regions.

4. The role of FSS relative to that of SES was greater for males than for females except for Negroes and Puerto Ricans. For Puerto Ricans the role of FSS was greater for females, while for Negroes this relationship varied by region.

5. For all racial-ethnic groups the role of PRCS exceeded that of HB.

6. ACHV was more likely to be affected by the relationship of PRCS and HB for males rather than females, except in the case of Puerto Ricans and Oriental-Americans. For Orientals, this was truer of females than of males, while for Puerto Ricans sex differences varied by region.

7. For most racial-ethnic and regional groups the role of MTVTN exceeded that of EDPLN, the primary exceptions occurring in the South. However, for Orientals the role of EDPLN exceeded that of MTVTN in most regions.

8. The role of EDPLN relative to that of MTVTN was uniformly greater for males than for females.

9. In average ACHV, Puerto Ricans and Negroes lagged behind whites by a greater amount in the South than in the North, while Indians and Mexican-Americans lagged behind whites to a slightly greater extent in the North than in the South, and Oriental-Americans lagged behind whites to a greater extent in the mid-Atlantic region than in the Far West.

10. Females tended to score higher on ACHV than males except for Indians and Negroes. For them, sex differences depended upon region.

11.The largest gap in ACHV across regions was for Negroes, Puerto Ricans, and Orientals (.6 of a standard deviation) and the smallest was for Mexicans (.3 of a standard deviation).

# Chapter 4

# RACIAL-ETHNIC GROUP DIFFERENCES

## 4.1. DEVELOPMENT OF A MEASURE OF RACIAL-ETHNIC GROUP MEMBERSHIP

This chapter explicitly introduces into our analysis a variable called Racial-Ethnic Group Membership (RETH), and shows how differences among students on this variable are related to their family background conditions. In order to create such a variable, each student was assigned the mean score on Achievement (ACHV) for the group in which he indicated that he was a member. Adoption of this procedure, which is known as criterion scaling, enables one to order groups on a continuum from high to low, and to incorporate this continuum in the analyses as a variable (Beaton, 1969). The results, shown in table 4.1, were computed after the ACHV scores had been converted to a mean of 50 and a standard deviation of 10. Those students who indicated their group membership as "Other," or who failed to indicate any group membership, were included in these analyses although they were excluded from the analyses in chapters 2-3 and appendix B.

**Table 4.1.—Percent of 9th-Grade Students and Their Mean Composite Achievement Scores, by Racial-Ethnic Group Membership**

| Category | Racial-Ethnic Group | Percent | Mean ACHV |
|---|---|---|---|
| 1 | Indian | 1.9 | 44.839 |
| 2 | Mexican | 4.4 | 43.599 |
| 3 | Puerto Rican | 1.6 | 40.643 |
| 4 | Negro | 16.0 | 41.609 |
| 5 | Oriental | 0.8 | 51.024 |
| 6 | White | 73.0 | 52.788 |
| 7 | Other | 1.0 | 45.707 |
| 0 | No response | 1.3 | 39.976 |
|  | Total | 100.0 | 50.000 |

NOTE.—The total number of students is 133,136. The standard deviation for the total was equal to 10. All figures are weighted for sampling.

It will be seen immediately that the relative ordering, in table 4.1, of group ACHV means in terms of distance from the total mean, is very similar to that given in table 2.6. Of the two groups not included in table 2.6, the "Other" group is almost half a standard deviation below the total mean, while the "No response" group is a full standard deviation below. The variable created in table 4.1 expresses differences among groups in a quantitative form that is especially well suited for entry into correlational and regression analyses with other variables. A high score on RETH indicates that a student is either white or Oriental-American, while a low score indicates that he is from one of the remaining groups. For example, a student who indicated that he was an Indian was assigned a score of 44.839, one who indicated that he was an Oriental was assigned a score of 51.024, and so on.

## 4.2. CORRELATES OF RACIAL-ETHNIC GROUP MEMBERSHIP

Correlations of RETH with the seven variables of interest, for each geographic group, are given in table 4.2. Comparisons between regions are perhaps best made in terms of deviation from the national value (i.e., the far right-hand column). For the correlation of SES with RETH, the extent of this deviation is rather slight for the different regions. The correlation is slightly lower in the nonmetropolitan North, but even there the deviation is never really substantial. We may conclude, then, that about 17 percent of the variation among students in their SES is associated with the achievement levels that characterize their racial-ethnic group (of course, this tells us nothing about SES and variations in ACHV *within* that group). Overall, the values for SES are exceeded only by those for ACHV, which were maximized by the scaling procedure itself.

**Table 4.2.—Correlates of Racial-Ethnic Group Membership**

|  | North |  |  | South |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|
| Variable Title | Nonmet | Met | Total | Nonmet | Met | Total | Nonmet | Met | Total |
| Socio-Economic Status (SES) | 39 | 42 | 40 | 42 | 41 | 40 | 42 | 43 | 41 |
| Family Structure and Stability (FSS) | 29 | 38 | 36 | 33 | 32 | 33 | 32 | 37 | 35 |
| Expectations for Excellence (EXPTN) | 16 | 20 | 19 | 17 | 14 | 15 | 15 | 18 | 17 |
| Attitude Toward Life (ATTUD) | 21 | 32 | 30 | 32 | 27 | 30 | 29 | 31 | 30 |
| Educational Plans and Desires (EDPLN) | 16 | 19 | 18 | 13 | 14 | 13 | 15 | 18 | 16 |
| Study Habits (HBTS) | 20 | 28 | 26 | 24 | 18 | 21 | 22 | 25 | 24 |
| Achievement (ACHV) | 37 | 45 | 43 | 52 | 50 | 51 | 47 | 47 | 47 |

NOTE.—The standard deviations of RETH for the different groups are: nonmet North, .84; met North, 1.01; North, total, .96; nonmet South, 1.08; met South, 1.14; South 1.14; South, total, 1.12; nonmet, total, .98; met, total, 1.05; and total, 1.02. The values in the last row are not directly comparable with the others, because the relationship of ACHV and RETH was maximized.

The values for the correlation of FSS with RETH show more regional variation than those for SES. For FSS, these values are greatest in the metropolitan North and least in the nonmetropolitan North, while the values for the South, both metropolitan and nonmetropolitan, are intermediate. Thus the variation in FSS associated with RETH varies from about 9 percent in the nonmetropolitan North to almost 16 percent in the metropolitan North.

For EXPTN, too, there is more pronounced regional variation than for SES. Values are greatest in the metropolitan North, least in the metropolitan South, and intermediate in the nonmetropolitan areas. Hence the percentage of variation in EXPTN associated with RETH varies from less than 2 in the metropolitan South to 4 in the metropolitan North. The association of ATTUD with RETH is highest in the metropolitan North and nonmetropolitan South and lowest in the nonmetropolitan North. The percentage of variation in ATTUD associated with RETH varies from a low of 4 to a high of 10. Correlation of EDPLN with RETH is higher in the North than in the South, especially in the metropolitan North. The percentages vary from a low of about 2 to a high of almost 4. Similarly, the highest correlates for HBTS are found in the metropolitan North and the lowest in the metropolitan South (the range is from 3 to almost 8 percent). There is a tendency for ACHV to correlate more highly with RETH than does any of the other measures. The magnitude of these correlations is greatest in the South, particularly the nonmetropolitan South, and lowest in the nonmetropolitan North. The percentages range somewhat as follows, from highest to lowest: nonmetropolitan South, 27 percent; metropolitan South, 25 percent; metropolitan North, 20 percent; and nonmetropolitan North, almost 14 percent.

Caution should be exercised in interpreting the correlates of RETH; the relationships that exist *among* groups of individuals may be quite different from those that exist *within* the same groups. For example, we saw in table 2.2 that FSS has a relatively low correlation with ACHV for Negroes and whites and a higher correlation for the other groups. These correlations show the relationship between the incidence of family disruption and its possible effect on ACHV for *each* separate group. The correlations in table 4.2, however, show the relationship between, say, the incidence of family disruption and being in one or the other of *several* groups. These are clearly not correlations of the same kind, although differences within a group may be of some help in understanding the effects of differences among groups on a particular variable. For example, we may use the relationship between family disruption and achievement for whites as an explanation of the fact that achievement is low among nonwhite groups, where family disruption is high. In doing this, of course, we assume that the relationship between family disruption and achievement is the same within each group—something that can by no means be taken for granted.

### 4.2.1. Association of Racial-Ethnic Group Differences

In examining the possible effects of family background on ACHV in previous chapters we classified our variables as relating either to the structural aspects of the family and its position in society, which we called Home Background (HB), or to its behavioral aspects, which we called Family Process (PRCS). Where does RETH belong in this dichotomy? Does it belong with our structural or with our behavioral variables? The following analyses should help us decide.

Table 4.3 shows the increase in the R-squares of Racial-Ethnic Group Membership accounted for by bringing into the regression successively more family background variables. The sequence followed in bringing them into the regression was to include first the structural factors of SES and FSS (HB being the two combined), then the more behavioral but still (in our view) partly structural ATTUD, then, in a progression toward the increasingly behavioral, EXPTN, MTVTN (a combination of ATTUD, EXPTN, and HBTS), and EDPLN.

The first aspect of table 4.3 to note is that RETH is more fully explained by these variables in the South than in the North. The R-squares obtained when all variables are entered in the regression (i.e., the bottom row) run from largest to smallest as follows: nonmetropolitan South; metropolitan North; metropolitan South; nonmetropolitan North. The R-square for the nonmetropolitan North is lower than for the other areas, being 5 percent less than for the metropolitan North and 7 percent less than for the nonmetropolitan South.

The second item to note is that the R-squares in the North level off somewhat sooner than those in the South. Actually, if we subtract the R-squares in the second row from those in the last row, thus taking HB into account, we find that there is only a 1 to 3 percent increase in the North, but a 4 to 6 percent increase in the South.

**Table 4.3.—Successive Increase in Percent of Variation of Racial-Ethnic Group Membership Accounted for by Family Background Variables**

| Set of Variables | North | | | South | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Nonmet | Met | Total | Nonmet | Met | Total | Nonmet | Met | Total |
| SES | 16 | 18 | 16 | 17 | 17 | 16 | 18 | 18 | 17 |
| HB | 18 | 21 | 20 | 20 | 19 | 19 | 20 | 21 | 20 |
| HB and ATTUD | 18 | 23 | 21 | 22 | 20 | 21 | 22 | 23 | 22 |
| HB, ATTUD, and EXPTN | 18 | 23 | 22 | 23 | 21 | 22 | 22 | 23 | 22 |
| HB and MTVTN | 18 | 23 | 22 | 23 | 21 | 22 | 22 | 23 | 22 |
| HB, MTVTN, and EDPLN | 19 | 24 | 22 | 26 | 23 | 24 | 24 | 24 | 24 |

NOTE.—For definitions and full names of the variables, see pp. 19–20.

Table 4.4.—Commonality Analyses of Home Background Measures With Racial-Ethnic Group Membership

| Region | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Unique | | Common | Unique | | Common | Unique | | Common |
| | SES | FSS | | SES | FSS | | SES | FSS | |
| North | 52 | 13 | 35 | 32 | 17 | 51 | 34 | 18 | 48 |
| South | 46 | 16 | 38 | 44 | 10 | 46 | 42 | 16 | 42 |
| Total | 50 | 13 | 37 | 36 | 14 | 50 | 39 | 16 | 45 |

One might conclude from table 4.3 that the home background factors of SES and FSS are really the only important ones since after they are entered into the regression the attitudinal and motivational measures make a much smaller relative contribution. We know, however, that if the variables were entered into the regression in a different order then these conclusions might change considerably. Accordingly, in the following sections we shall examine the relative roles played by these different home background factors.

### 4.2.2. Commonality Analyses of Home Background Measures With Racial-Ethnic Group Membership

Which one of the home background factors, SES or FSS, plays the greater role? In table 4.4, the relevant commonality analyses have been unitized by dividing out the R-square for the two variables (these R-squares are given in the second row of table 4.3). It will be seen that SES has its largest role in RETH in the nonmetropolitan North and its smallest role by 20 percentage points, in the metropolitan North. In the South the values for SES are almost midway between those in the nonmetropolitan and metropolitan North. The relative role of FSS does not vary as much from region to region as does that of FSS. The values for FSS are largest in the metropolitan North and nonmetropolitan South, next largest in the nonmetropolitan North, and smallest in the metropolitan South. Noteworthy, also, is the common portion that is greatest in the metropolitan areas, particularly the metropolitan North. This enlarged common portion indicates that there is a greater confounding or correlation of SES with FSS as they relate to RETH in these areas. In summary, SES plays a greater role in RETH than does FSS by a factor of 4 to 1 in the nonmetropolitan South and by only 2 to 1 in the metropolitan North. The confounding of SES with FSS as these two sets of variables relate to RETH is more pronounced in metropolitan than in nonmetropolitan areas, particularly in the North.

### 4.2.3. Commonality Analyses of Family Background Measures With Racial-Ethnic Group Membership

What role do SES and FSS—the home background factors—play when put in context with the set of attitudinal and motivational measures that we have called PRCS? Commonality analyses of the relative roles of these variables are given in table 4.5 (the R-squares that were divided out can be obtained from the sixth row of table 4.3).

It is clear from table 4.5 that by far the greatest role in RETH is played by the factors that make up HB. The factor by which the role of HB exceeds that of PRCS runs in each case as follows: nonmetropolitan North, 13 to 1; metropolitan areas, both North and South, about 4 to 1; and nonmetropolitan South, 3 to 1. However, the common portion, or extent to which HB and PRCS overlap in their relationship with RETH, is greatest in the metropolitan North and lowest in the metropolitan South, with intermediate values for the nonmetropolitan areas. In summary, the role of HB greatly exceeds that of PRCS by as much as 3 or 4 to 1 in the nonmetropolitan South and metropolitan areas, and by as much as 13 to 1 in the nonmetropolitan North.

Similar analyses of the relative roles of EDPLN and MTVTN were not conducted because of the small portions of variation in RETH that could be attributed to them independently of HB.

## 4.3. IS RACIAL-ETHNIC GROUP MEMBERSHIP STRUCTURAL OR BEHAVIORAL?

Having created RETH, what have we learned so far? The high correlation of RETH with ACHV does not tell us much, since it was to be expected on the basis of the procedures used. However, it is interesting that this correlation is very much higher in the South, whereas the next highest correlation, which is with SES, tends to be fairly uniform over the different regions. Values for the third highest correlate, FSS, are greatest in the metro-

Table 4.5.—Commonality Analyses of Family Background Measures With Racial-Ethnic Group Membership

| Region | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Unique | | Common | Unique | | Common | Unique | | Common |
| | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | 68 | 5 | 27 | 51 | 12 | 37 | 53 | 12 | 35 |
| South | 56 | 20 | 24 | 66 | 18 | 16 | 60 | 20 | 20 |
| Total | 61 | 14 | 25 | 56 | 13 | 31 | 56 | 14 | 30 |

FIGURE 4.1. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND MEASURES, WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED, BY GEOGRAPHIC LOCATION

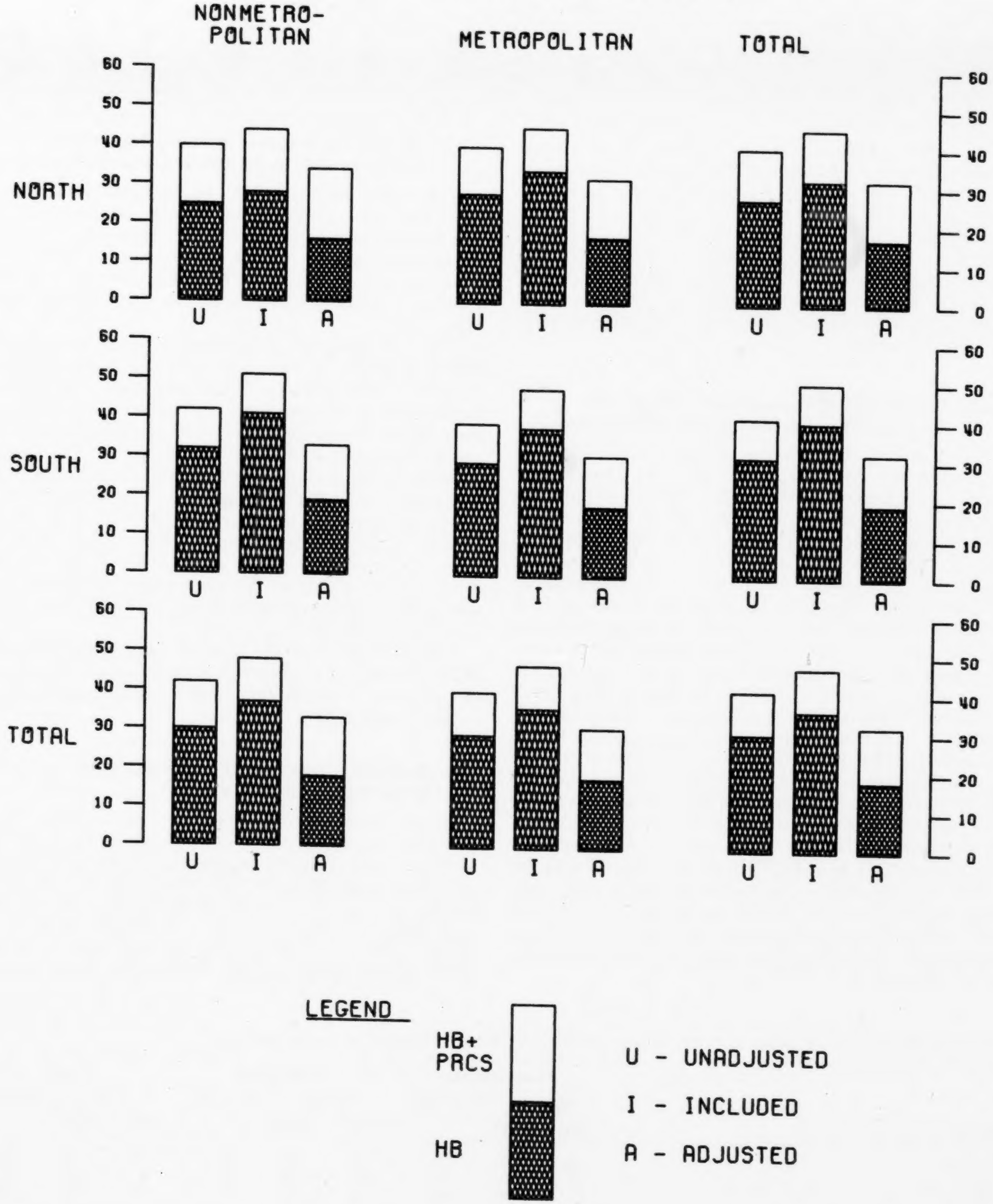


Figure 4.1 (6a)

politan North, least in the nonmetropolitan North, and intermediate in the South. As for the other variables, EDPLN and EXPTN are somewhat more highly related to RETH in the North than in the South, while the values for ATTUD are highest in the metropolitan North and nonmetropolitan South and lowest in the nonmetropolitan North. The trend for ATTUD tends also to prevail for HBTS.

Our attempt to classify RETH was carried one stage further by regression and by commonality analyses with RETH as the dependent variable. The regression analyses showed that RETH is more highly associated with the HB measures of SES and FSS, both alone and in combination with the PRCS measures. This association is highest in the nonmetropolitan South and lowest in the nonmetropolitan North; the metropolitan areas fall in between. The commonality analyses showed that SES plays a greater role than FSS in RETH, and that the factor by which it does so varies by region as follows: nonmetropolitan North and metropolitan South, 4 to 1; nonmetropolitan South, 3 to 1; and metropolitan North, 2 to 1. The extent to which SES and FSS overlap in their relation with RETH is also more pronounced in the metropolitan than in the nonmetropolitan areas, particularly in the North.

Finally, HB was placed in context with the set of attitudinal and motivational factors called PRCS. It was found that the unique role of HB exceeded that of PRCS by as much as 13 to 1 in the nonmetropolitan North, and by at least 3 to 1 in other areas.

Taken together, these analyses suggest that the set of variables that represents the structural aspects of the family plays a greater role in explaining racial-ethnic differences among students than does the set that represents the more attitudinal and motivational variables. In other words, a student's social and economic class, and the social and economic stability of his family, are more closely related to his racial-ethnic group membership than are his parents' aspirations for him or the activities they engage in to support these aspirations. This is true whether HB and PRCS are considered separately or in combination. All these results suggest that RETH belongs with HB, not PRCS, and should therefore be classified as a structural variable rather than a behavioral one.

## 4.4. THE ROLES OF FAMILY BACKGROUND AND RACIAL-ETHNIC GROUP MEMBERSHIP IN THE DEVELOPMENT OF ACHIEVEMENT

It is now time to introduce Racial-Ethnic Group Membership explicitly into our analyses in order to assess its role in the development of Achievement. Specifically, the questions we need to address are:

1. How do the relative roles of Socio-Economic Status and Family Structure and Stability change with reference to Achievement when Racial-Ethnic Group Membership is entered into the analysis?

2. How do the relative roles of Home Background and Process in Achievement change when Racial-Ethnic Group Membership is entered into the analysis?

3. After Achievement has been adjusted for differences in Home Background, how do the relative roles of Educational Plans and the measures called Motivation change when Racial-Ethnic Group Membership is entered into the analysis?

### 4.4.1. Commonality Analyses of Home Background Measures With Racial-Ethnic Group Membership

To what extent is ACHV associated with the different sets of variables in different regions of the country? Figure 4.1 provides some answers. Here, R-squares are presented for six kinds of analyses. There are two analyses for the different background variables, one for HB, and one for HB and PRCS combined. There are also three types of analyses pertaining to the status of RETH. The "U" designation indicates that ACHV has not been adjusted for RETH, while the "I" designation indicates that RETH has been included as a third HB variable (the other two, of course, are SES and FSS). Finally, the "A" designation indicates that ACHV was first adjusted for RETH by means of partial correlation techniques, and then entered into the regression and commonality analyses. The analyses differ slightly from those given in chapters 3 and 4 since they include about five thousand more students. These additional students are the ones whose group membership is given as "Other" or "No response."

Before proceeding further let us dwell for a moment on the meaning of these three different kinds of analyses. In the first kind, termed "U," differences among as well as differences within each of the racial-ethnic groups are present but are not explicitly entered into the analysis. In the second, termed "I," RETH is entered into the analysis and classified as an aspect of HB. By comparing the results of these two kinds of analyses it is possible to gauge the extent to which the factors being analyzed (i.e., HB and PRCS) are uniquely associated with RETH. Finally, comparison of the first and third types of analysis allows one to gauge the similarity of the roles played by the sets of variables after RETH has been explicitly taken out of ACHV. The third type of analysis—that is, the one called "A"—treats differences among students that are independent of their RETH.

In figure 4.1 the shaded portions of the bar graphs show what happens to the R-squares for HB when RETH is included as an HB variable (I) and when it is adjusted out (A). These graphs show that when RETH is included as part of HB the R-squares under "I" increase over their corresponding "U" values by 9 percent in the South (both metropolitan and nonmetropolitan); by 6 percent in the metropolitan North; and by 3 percent in the nonmetropolitan North. However, when ACHV is first adjusted for RETH—the "A" values—the R-squares are lower than those for "U" by about 13 percent in the nonmetropolitan South, 11 percent in the metropolitan areas, and 9 percent in the nonmetropolitan North.

Commonality analyses of the relative roles of SES and FSS are shown in table 4.6. These analyses are of two kinds. The first row for each geographic group contains values—labeled "U"—obtained before ACHV was ad-

Table 4.6.—Commonality Analysis of Home Background, When Achievement Is Adjusted (A) and Unadjusted (U) for Racial-Ethnic Group Membership, by Geographic Location

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Type [a] | SES | FSS | | SES | FSS | | SES | FSS | |
| North | U | 72 | 3 | 25 | 55 | 3 | 47 | 60 | 3 | 37 |
| | A | 81 | 2 | 17 | 71 | 2 | 27 | 74 | 2 | 24 |
| South | U | 69 | 3 | 28 | 63 | 2 | 35 | 67 | 2 | 31 |
| | A | 85 | 1 | 14 | 76 | 1 | 23 | 82 | 1 | 17 |
| Total | U | 71 | 2 | 27 | 58 | 3 | 39 | 63 | 3 | 34 |
| | A | 84 | 1 | 15 | 73 | 1 | 26 | 78 | 1 | 21 |

[a] U" denotes that Achievement was unadjusted for Racial-Ethnic Group Membership, "A" that it was adjusted.

Table 4.7.—Commonality Analyses of Home Background and Process With Achievement, When Racial-Ethnic Group Membership Is Included and Excluded, by Geographic Location

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Type [a] | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | U | 11 | 38 | 51 | 14 | 29 | 57 | 13 | 32 | 55 |
| | I | 18 | 36 | 46 | 24 | 24 | 52 | 22 | 29 | 49 |
| | A | 6 | 53 | 41 | 8 | 46 | 46 | 7 | 47 | 46 |
| South | U | 20 | 25 | 55 | 23 | 25 | 52 | 22 | 25 | 53 |
| | I | 35 | 19 | 46 | 38 | 21 | 41 | 36 | 20 | 44 |
| | A | 10 | 42 | 48 | 12 | 42 | 46 | 12 | 41 | 47 |
| Total | U | 18 | 28 | 54 | 17 | 27 | 56 | 18 | 27 | 55 |
| | I | 39 | 25 | 46 | 28 | 23 | 49 | 29 | 23 | 48 |
| | A | 9 | 46 | 45 | 9 | 44 | 47 | 10 | 43 | 47 |

[a] "U" denotes that Achievement was unadjusted for Racial-Ethnic Group Membership; "A" that it was adjusted; and "I" that Racial-Ethnic Group Membership was included as an HB variable.

justed for RETH. The second row contains values—labeled "A"—obtained after ACHV was adjusted for RETH. Comparison of these two sets of values shows that, in every region, the unique role of SES increases and that of FSS decreases after adjustment. The increase in SES is on the order of 16 percentage points in the nonmetropolitan South and metropolitan North, 13 points in the metropolitan South, and 9 points in the nonmetropolitan North. In each regional group, FSS decreases by only 1 percent. The common portions also show a decrease. The magnitude of this decrease is greatest in the metropolitan North (20 percentage points), intermediate in the South (14 points for nonmetropolitan and 12 points for metropolitan), and least in the nonmetropolitan North (8 points). These results are not surprising when one considers that in the previous chapter the three variables of SES, FSS, and ACHV were those most closely related with RETH. In summary, then, these analyses have shown that, after ACHV has been adjusted for differences in RETH, for the variance that remains the unique role of SES is greatly increased (by a factor of as much as 1.3 to 1) while the unique role of FSS is slightly decreased.

### 4.4.2. Commonality Analyses of Home Background and Process Measures With Racial-Ethnic Group Membership

How do the relative roles of HB and PRCS change when RETH is entered into the analysis? Commonality analyses of these roles for our three types of analyses are given in table 4.7. These analyses show that when the "U" and "I" analyses are compared (i.e., when we study the effect of including RETH in HB), the unique role of HB increases by about 7 percentage points in the nonmetropolitan North, 10 points in the metropolitan North, and 15 points in the South. This increase in the role of HB is accompanied by a corresponding decrease in that of PRCS and of the common portions as well. For PRCS the decrease varies from about 2 percent in the nonmetropolitan North to between 4 and 6 percent for the other regions. The common portions show a decrease of about 5 percent in the North and between 9 and 11 percent in the South.

These results seem to suggest that when Racial-Ethnic Group Membership is combined with Socio-Economic Status (SES), on the one hand, and Family Structure and Stability (FSS), on the other, the result is to make Home Background (which of course is SES and FSS together) even more difficult to overcome by educationally related child rearing activities. This effect becomes more pronounced as one moves from the nonmetropolitan North through the metropolitan North to the South.

The trend becomes even clearer if we compare the extent to which the magnitude of the role of PRCS, which includes the educationally related activities, exceeds that for HB in both the "U" and "I" analyses. The approximate ratios are as follows.

| | Nonmetropolitan | Metropolitan |
|---|---|---|
| North: | | |
| U | 3.5 | 2.0 |
| I | 2.0 | 1.0 |
| South: | | |
| U | 1.3 | 1.1 |
| I | .6 | .6 |

What these ratios suggest is that the combined role of SES and FSS in ACHV is surmounted through PRCS, but that the combined role of SES, FSS, *and* RETH in ACHV is *not* thus surmounted, except in the nonmetropolitan North. These results will be taken up in more detail below.

This interpretation is given some support by the "A" analyses. When these are compared with the "U" and "I" analyses, it appears that the role of HB is appreciably diminished—indeed, it is diminished respectively by one-half and two-thirds. By contrast, the role of PRCS becomes from 1.4 to 1.5 times larger than for "U," and from 1.4 up to twice as large as for "I." Thus, when racial-ethnic differences in ACHV are explicitly omitted the role of HB is much more likely to be decreased and that of PRCS increased, than when they are either not taken into account or are explicitly regarded as part of HB.

### 4.4.3. Commonality Analyses of Educational Plans and Other Motivational Measures With Racial-Ethnic Group Membership

In this section we address our third and last question, namely: How do the relative roles of EPLN and MTVTN change when RETH is entered into the analysis? By EDPLN, it will be remembered, is meant the variable called Educational Plans and Desires, while MTVTN stands for the other three PRCS measures of Attitude Toward Life, Expectations for Excellence, and Study Habits. Analyses for these two sets of variables are of two types. For the first type, called "A," ACHV was adjusted for differences in HB, and then regression and commonality analyses were run. For the second type of analysis, called "A′," ACHV was adjusted for both HB and RETH, and then commonality analyses were run. For these analyses, the percent of variation being dealt with is indicated by the unshaded portions of the bar graphs for the "U" and "I" values in figure 4.1. These portions range from about 13 percent in the North to 10 percent in the South for "U," and from about 13 percent in the North to 11 percent in the South for "I."

The commonality analyses shown in table 4.8 indicate that for the "A" values the role of MTVTN is greater than that of EDPLN, particularly in the South. However, when adjustments are also made for RETH, the "A′" values indicate that the role of EDPLN now becomes much more prominent and even exceeds that of MTVTN. This effect is perhaps best displayed by comparing the ratios of the extent to which MTVTN exceeds EDPLN for these two kinds of analyses, as follows.

| | Nonmetropolitan | Metropolitan |
|---|---|---|
| North: | | |
| A | 1.1 | 1.5 |
| A′ | .8 | .8 |
| South: | | |
| A | 2.9 | 1.9 |
| A′ | .8 | .7 |

These ratios show that before RETH is taken into account the role of MTVTN exceeds that of EDPLN, particularly in the South. However, when RETH is explicitly set aside then the relative roles of EDPLN and MTVTN become more uniform for all regions. In fact, the role of EDPLN is about 1.2 times greater than that of MTVTN.

## 4.5. REGIONAL VARIATIONS IN ACHIEVEMENT

Finally, it may be desirable to focus on the extent to which ACHV is associated with different sets of variables in different regions. We may inquire first as to where the differences among students in their ACHV are greatest. The standard deviations of ACHV for the different regions are: nonmetropolitan North, 3.47; metropolitan North, 3.62; metropolitan South, 3.71; and nonmetropolitan South, 3.85. Although it does not necessarily follow that the extent of association of differences among students in their ACHV will be greatest where their dispersion about their mean is greatest, this phenomenon did occur for these data. That is, the extent to which ACHV was associated with the different sets of variables

**Table 4.8.—Commonality Analyses of Educational Plans and Other Motivational Measures, When Achievement Is Adjusted for Home Background (A) and Also for Racial-Ethnic Group Membership (A′), by Geographic Location**

| Region | Type [a] | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| | | EDPLN | MTVTN | | EDPLN | MTVTN | | EDPLN | MTVTN | |
| North | A | 29 | 32 | 39 | 25 | 37 | 38 | 26 | 36 | 38 |
| | A′ | 32 | 27 | 41 | 33 | 26 | 41 | 33 | 26 | 41 |
| South | A | 18 | 53 | 29 | 24 | 45 | 31 | 21 | 49 | 30 |
| | A′ | 35 | 28 | 37 | 37 | 26 | 37 | 37 | 26 | 37 |
| Total | A | 24 | 43 | 33 | 25 | 41 | 34 | 25 | 41 | 34 |
| | A′ | 34 | 28 | 38 | 34 | 26 | 40 | 35 | 26 | 39 |

[a] A denotes that Achievement was adjusted for HB but not for Racial-Ethnic Group Membership, while A′ denotes adjustment for both.

followed closely the sequence in which the groups were ordered by the magnitude of their standard deviations. This tended to be true for HB, for PRCS, and for RETH, when each is either alone or in different combinations. Indeed, the percent of total differences among students in their ACHV associated with the six family background variables (viz, HB and PRCS) plus RETH varied as follows: nonmetropolitan North, 44 percent; metropolitan North, 45 percent; metropolitan South, 48 percent; and nonmetropolitan South, 51 percent. Thus, almost half of the total differences among students in their ACHV was associated with these seven variables. In addition, the percent of the total differences in ACHV that could be associated with RETH after taking into account the six family background variables ranged from 4 to 5 percent in the North to 9 percent in the South.

## 4.6. SUMMARY

In this chapter a variable was introduced that captured differences associated with the students' Racial-Ethnic Group Membership. This variable, called RETH for short, was created by assigning to each student the mean score attained by his racial-ethnic group on Achievement (ACHV). Thus a high score on RETH indicated that the student identified himself as being white or Oriental-American (the groups with the highest mean ACHV), while a low score indicated that he identified himself as belonging to one of the other groups.

Correlates of RETH were then reviewed in order to tabulate regional variations among groups, and to determine whether the role of RETH in ACHV was more that of a structural variable, like those in the HB set, or a behavioral variable, like those in the PRCS set. Our analyses showed that its role was more like that of a structural variable.

We went on to pose three questions designed to uncover the effects of entering RETH into commonality analyses of HB, PRCS, EDPLN, and MTVTN with ACHV. It should be emphasized that we dealt only with the differences associated with the variables under analysis. To this end, the analyses were unitized by dividing out the percentage of variation (R-square) for each group. This operation made the commonality analyses for each group add up to 100, thus rendering the results more directly comparable between groups.

The first question posed was: How do the relative roles of SES and FSS change when RETH is entered into the analysis? To introduce RETH, differences in ACHV associated with RETH were first eliminated by means of partial correlation techniques. Commonality analyses were then performed on the adjusted scores. When the results for these analyses were compared with those obtained before RETH was eliminated, it was noted that the unique role of SES was considerably increased, while that for FSS was slightly reduced and the common portion substantially reduced. The following ratios, computed from table 4.6, indicate the extent to which the role of SES exceeds that of FSS before and after RETH was eliminated ("U" indicates unadjusted—i.e., with RETH still in—and "A" adjusted—i.e., with RETH out).

| | Nonmetropolitan | | Metropolitan | |
|---|---|---|---|---|
| | U | A | U | A |
| North | 24 | 40 | 18 | 35 |
| South | 23 | 85 | 31 | 76 |

Obviously there is a remarkable increase in the role of SES when RETH is explicitly omitted. These results suggest that when racial-ethnic group differences in Achievement are set aside, Socio-Economic Status looms even more importantly as a key variable in understanding the differences in Achievement that remain. Under these same conditions, Family Structure plays a slightly reduced role, although there remains a portion of Family Structure that is in common with Socio-Economic Status. In nontechnical language, this means that a proportionately greater amount of family disruption still prevails among the less affluent groups.

The next question was: How do the relative roles of the HB and PRCS variables change when RETH is introduced into the analysis? This time, RETH was introduced into the analysis in two ways. In one analysis, labeled "A," differences in ACHV associated with RETH were first adjusted out by means of partial correlation techniques. In the second analysis, labeled "I," RETH was included as an HB variable. This classification of RETH was based on the analyses mentioned earlier in this summary. The results of the "A" and "I" analyses were then compared with those obtained when RETH was not explicitly introduced into the analysis. The approximate ratios of the extent to which the role of PRCS exceeds that of HB are given below.

| | Nonmetropolitan | | | Metropolitan | | |
|---|---|---|---|---|---|---|
| | U | I | A | U | I | A |
| North | 3.5 | 2.0 | 8.8 | 2.0 | 1.0 | 5.8 |
| South | 1.3 | .6 | 4.2 | 1.1 | .6 | 3.5 |

These ratios show that when RETH is included as an HB variable—the "I" analyses—the role of HB is considerably increased over that indicated by the "U" analyses, and the role of PRCS is substantially reduced. These results suggest that when RETH, which might be regarded in part as the skin color aspect of the social structure, is combined with the HB variables of SES and FSS, the combined role of these three variables in ACHV is more difficult to overcome through educationally related child rearing activities (the PRCS variables). This effect becomes increasingly more pronounced as one moves from the nonmetropolitan North through the metropolitan North to the South. Indeed, the role of HB when RETH is included is surpassed by PRCS only in the nonmetropolitan North. This interpretation is supported by the ratios for the "A" analyses, which show that when RETH is explicitly omitted from analysis, the relative role of HB is greatly diminished and that of PRCS greatly augmented, particularly in the North.

The last question was: How do the relative roles of Educational Plans (EDPLN) and the other PRCS measures (called MTVTN) change when RETH is entered into the analysis? To answer this question, two kinds of analyses were run. In the first analysis, labeled "A," ACHV was first adjusted for the two HB variables, SES and FSS. Commonality analyses were then run. In the second analysis, labeled "A′," ACHV was adjusted for *both* HB and RETH before the commonality analyses were run. The following show the extent to which the role of MTVTN exceeds that of EDPLN for each kind of analysis.

| | Nonmetropolitan | | Metropolitan | |
|---|---|---|---|---|
| | A | A′ | A | A′ |
| North | 1.1 | .8 | 1.5 | .8 |
| South | 2.9 | .8 | 1.9 | .7 |

These ratios show that when ACHV is adjusted for HB but not for RETH—the "A" analyses—the role of MTVTN exceeds that of EDPLN, particularly in the nonmetropolitan South. However, when RETH is explicitly set aside—the "A′" analyses—the different regions become more uniform, with the role of EDPLN exceeding that of MTVTN. Thus, when considerations of family affluence and structure are set aside, MTVTN plays a greater role than EDPLN, particularly in the South. However, when both these home background conditions and racial-ethnic group difference are set aside, the longer range educational plans and aspirations assume a greater role than the more immediate kinds of motivations. This tends to be uniformly so for all regions.

In sum, we have seen in this chapter that, when racial-ethnic differences in achievement are set aside, for the differences among students in achievement that remain:

1. Socio-Economic Status assumes a greater role relative to Family Structure.
2. Family Structure becomes somewhat less intertwined with Socio-Economic Status.
3. The aspirations that parents have for their children's school performance, and the activities that they engage in with them in support of these aspirations, assume a much greater role relative to the home background conditions.
4. Longer range educational plans assume a greater role than more immediate motivations.

If one is willing to assume that this statistical operation of setting aside racial-ethnic differences is a fair approximation of what would happen in a society in which the achievement levels of the various racial-ethnic groups are similar, then these analyses may indicate the relative role, and perhaps the relative importance as well, of some of these variables under these conditions.

## Chapter 5

# FAMILY BACKGROUND AND STUDENT ACHIEVEMENT

This chapter develops in detail the concepts of differences among students, among schools, and among students within schools. These concepts have great importance for the study of school influences. They indicate the maximum extent to which individual differences can be explained by differences in the characteristics of the schools students attend. For those who are interested in improving the achievement and motivational levels of school age children, these concepts indicate the extent to which the schools may serve as a vehicle for bringing about these changes.

We can think of the *differences among students* in an attribute such as achievement as being composed of two parts. The first part is the extent to which the attribute is associated with the different schools students attend. For example, some schools will have a higher achievement average than others because they have a greater proportion of high-achieving students. We can label this source of variation DAS, or *differences among schools.* The second part is the extent to which students *within* schools differ from one another in an attribute. Returning to our example of achievement, we can recognize that in any school, regardless of the school's average, some students will have higher achievement scores than others. This source of variation we can label DWS, or *differences among students within schools.* These two values can be summed to give *total differences among students*, which we can label DAT. The equation, then, is of the form:

DAT=DAS+DWS
Where
DAT=total differences among students
DAS=differences among schools
DWS=differences among students within schools.

The value DAS is of particular interest to us when studying school influences because it represents the extent to which a particular attribute, such as achievement, *might* be influenced by altering the characteristics of the schools. This value, as we will use it, is obtained by squaring the correlation of the individual student variable with its corresponding school mean. If, for example, the correlation between individual student achievement and school mean achievement is .5, then .25, or 25 percent, of the variance in individual student achievement is the maximum amount that can be explained by studying differences among schools. Since 1.00 is the maximum value that a correlation coefficient can assume, the amount that is left unexplained is $1.00-.25$, or .75. This latter amount is relegated to the term DWS (and to error).

Now that we have some familiarity with these concepts we can formulate the questions to be addressed in this chapter:

1. To what extent are Achievement (ACHV) and the various Family Background (FB) measures associated with the schools students attend?
2. How do the relative roles of the Home Background (HB) and Process (PRCS) measures change at the individual and aggregate (i.e., school) levels?
3. How do the results for this second question change when Racial-Ethnic Group Membership (RETH) is introduced into the analysis?

In these questions the term "individual level" is used to refer to total differences among students and to differences among students within schools, while the term "aggregate" or "school level" is used to refer to differences among schools.

### 5.1. DO SIMILAR STUDENTS ATTEND SCHOOL TOGETHER?

Table 5.1 gives the squared correlations between selected student measures and the corresponding mean differences among schools (DAS). These figures indicate the extent to which students who are similar with regard to each attribute go to school with one another. We can note from this table that the aggregation of students into schools on the basis of their RETH is quite pronounced, ranging from 66 to 75 percent in the South and from 38 to 48 percent in the North. Indeed, these values far exceed those for any other attribute. The next two attributes that have the largest percentages are ACHV and SES. In the South, about 33 percent of the differences among students in their ACHV is associated with the schools they attend. This value drops to 23 percent in the metropolitan North and to 14 percent in the nonmetropolitan North. For SES, the percentage values range about 5 to 7 percentage points higher in the South than in the North. Much the same is true of FSS and HBTS. There is a notable north-south difference in ATTUD, with the values in the South about 7 to 12 points higher than those in the North. For EDPLN, the percentages are more nearly uniform, being about 2 points lower in the nonmetropolitan North than in the other areas.

In sum, there is a pronounced tendency for students of the same Racial-Ethnic Group Membership to attend school with one another, particularly in the South. Indeed, for each one of the FB measures and for ACHV, students in the South attend schools with students who

Table 5.1.—Percent of Variation in Individual Student Measures Associated With the Schools Students Attend

| Variable Title | North |  |  | South |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Nonmet | Met | Total | Nonmet | Met | Total | Nonmet | Met | Total |
| Socio-Economic Status (SES) | 19 | 22 | 22 | 26 | 27 | 28 | 25 | 24 | 26 |
| Family Structure and Stability (FSS) | 8 | 10 | 9 | 12 | 17 | 14 | 11 | 12 | 12 |
| Racial-Ethnic Group Membership (RETH) | 38 | 48 | 46 | 66 | 75 | 71 | 56 | 57 | 57 |
| Expectations for Excellence (EXPTN) | 6 | 5 | 5 | 8 | 7 | 8 | 7 | 6 | 6 |
| Attitude Toward Life (ATTUD) | 10 | 13 | 12 | 22 | 20 | 21 | 18 | 15 | 16 |
| Educational Plans and Desires (EDPLN) | 7 | 9 | 8 | 9 | 9 | 9 | 8 | 9 | 9 |
| Study Habits (HBTS) | 7 | 7 | 7 | 14 | 13 | 13 | 11 | 9 | 10 |
| Achievement (ACHV) | 14 | 23 | 20 | 33 | 32 | 33 | 28 | 27 | 27 |
| Number of Schools | 160 | 249 | 409 | 411 | 103 | 514 | 571 | 352 | 923 |
| Number of Students | 15,552 | 67,535 | 83,087 | 33,076 | 16,973 | 50,049 | 48,628 | 84,508 | 133,136 |

NOTE.—Analyses using a different data analysis model yielded slightly larger values (Mayeske et al., 1969). The kind of model that is most appropriate for these analyses is currently under investigation.

are more like themselves on these attributes than do students in the North. In the North, students in metropolitan areas are more likely to attend school with others similar to themselves than are students in nonmetropolitan areas. But these differences are not nearly of the magnitude of those between North and South.

The percentages in table 5.1 shed light on our first question, for they tell us about the way in which students are aggregated into schools. However, they do not tell us about the possible *influence* of the schools. To answer this question, we would first want to make adjustments for certain aspects of the student's Family Background. These kinds of analyses are performed in the next few chapters. The remainder of this chapter, however, in attempting to answer the questions initially posed, focuses on the manner in which the aggregation of students into schools on the basis of their Family Background may affect the school's functioning.

## 5.2. COMMONALITY ANALYSES OF FAMILY BACKGROUND VARIABLES AT THE INDIVIDUAL AND SCHOOL LEVEL

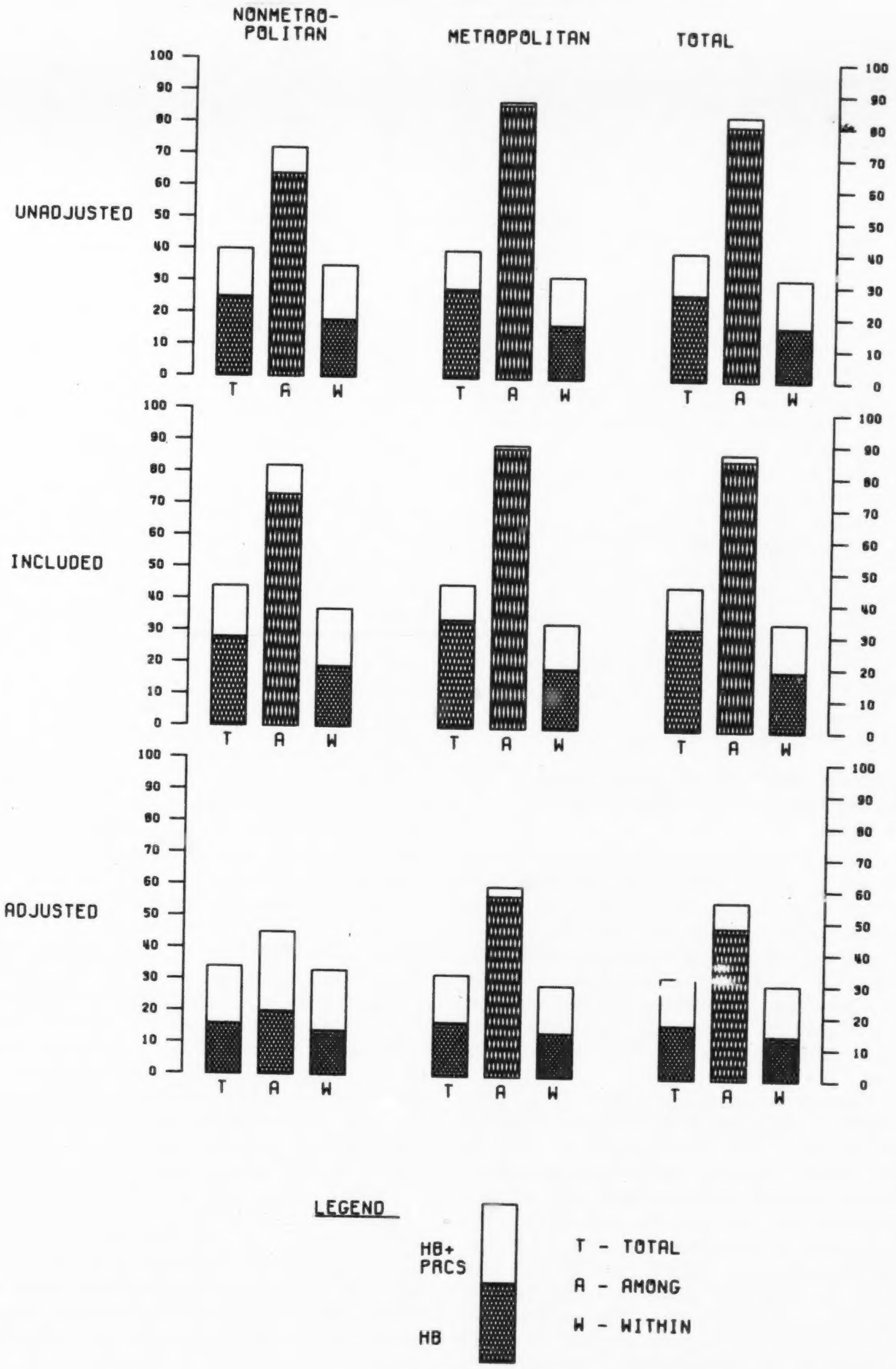
In this section we move on to our second question, namely: How do the relative roles of the HB and PRCS measures change in moving from the individual to the school level? The extent to which these two sets of variables play similar roles may tell us something about their relative importance. In addition, the extent to which their relative roles change in moving from the individual to the school level may tell us something about the nature of the variables in the aggregate that does not hold at the individual level.

Let us first focus on how we conduct total ("T") among ("A") and within ("W") school regressions. It will be recalled from chapter 1 (see also appendix A) that the data analysis model employed generates correlations among individual students, among schools, and between individual students and the schools they attend. For illustrative purposes, let us assume that we want to conduct a regression analysis of ACHV on SES. The total analysis ("T") for individual students is obtained by using the correlations among students. The among-school analysis ("A") is obtained by using the correlations among schools. The within-school analysis ("W") is obtained by partialing out of individual ACHV its corresponding among-school value, and then regressing the adjusted or residual ACHV scores on individual SES. This technique makes the adjusted or residual scores uncorrelated with (or independent of) differences among schools.

In this chapter, as in the previous one, three different types of analyses are conducted. To recapitulate: the first type, "U," analyzes the relative roles of the HB and the PRCS variables without regard to RETH; the second type, "I," includes RETH as an HB variable; and the third type, "A," adjusts differences among students in their ACHV associated with RETH, and then performs regression analyses within each racial-ethnic group on the adjusted scores. Thus for each of the three *levels* of analysis, "T," "A," and "W," there are the three *types* of analysis, "U," "I," and "A." In the remainder of this chapter results for each type of analysis are presented together with the three levels shown in each table. To make the results comparable across levels as well as regions, the results of commonality analyses are unitized so that they sum to 100. Before these analyses are compared, however, let us see to what extent ACHV is explained by these sets of variables at the individual and school levels.

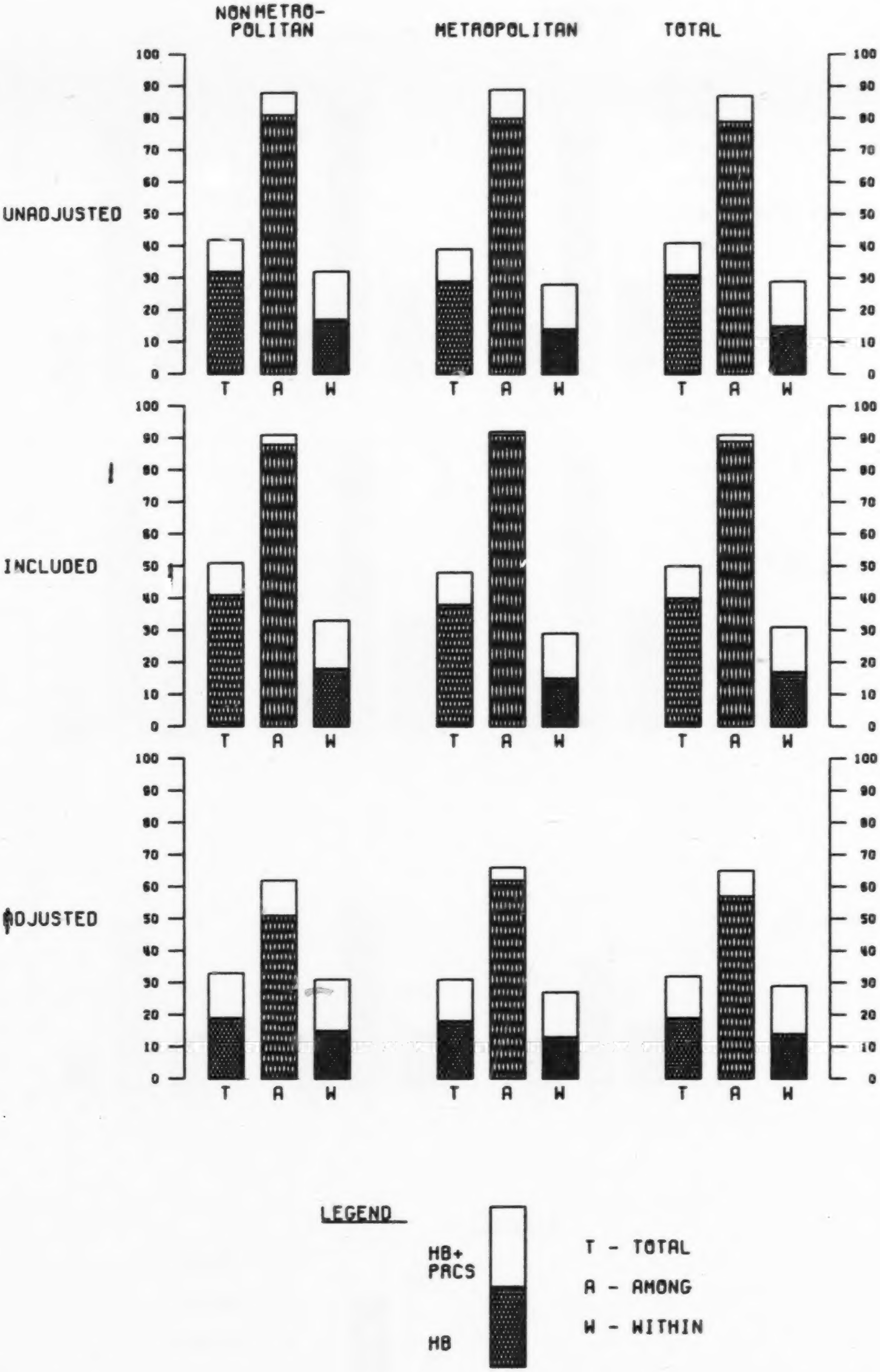
Figure 5.1 shows bar graphs of the percent of variation in ACHV (the R-square) accounted for by HB and PRCS for all three levels and all three types of analysis. The shaded portion of the bar graph represents the *R*-square for HB, while the shaded and plain portions combined represent those for FB (that is, HB and PRCS combined). The most salient feature of this figure is the enormous extent to which the R-squares at the school level, "A," exceed those at the individual levels, "T" and "W." If we look at the shaded and plain portions combined we can note that the R-squares at the "A" level are two to three times greater than those at the individual levels. When just the plain portions are examined (viz, the portions of R-squares uniquely attributable to PRCS), it can be seen that these portions tend to be smaller at the "A" level than at the "T" and "W" levels. A slight exception to this trend occurs in the nonmetropolitan North. There is also a slight tendency for the plain portions to be larger for the "W" than for the "T" levels.

FIGURE 5.1. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND MEASURES FOR TOTAL (T), AMONG(A), AND WITHIN (W) DIFFERENCES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED--NORTH



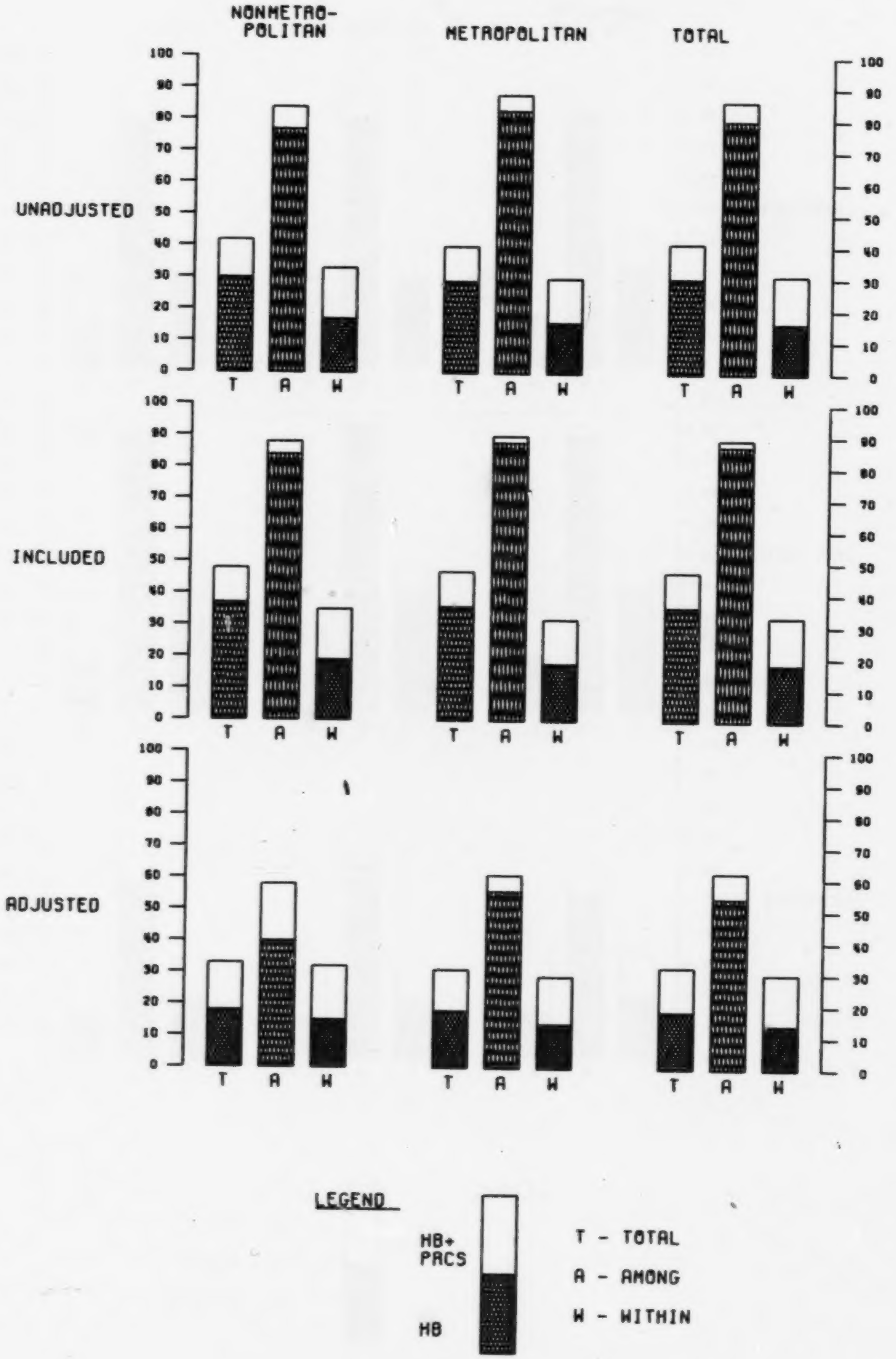
5.1

FIGURE 5.1. (CONT'D.) - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND MEASURES FOR TOTAL (T), AMONG (A), AND WITHIN (W) DIFFERENCES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED--SOUTH



5.1

FIGURE 5.1. (CONT'D.) - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND MEASURES FOR TOTAL (T), AMONG (A), AND WITHIN (W) DIFFERENCES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED--TOTAL



5.1
Fig. 5.1 Illustrations 7a, 8a, & 9a

**Table 5.2.—Commonality Analyses of Family Background Measures for Total (T), Among (A), and Within (W) Differences, When Racial-Ethnic Group Membership Is Not Included (U), by Geographic Location**

| Region | Level of Analysis | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| | | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | T | 11 | 38 | 51 | 14 | 29 | 57 | 13 | 32 | 55 |
| | A | 33 | 11 | 56 | 17 | 2 | 81 | 20 | 3 | 77 |
| | W | 6 | 50 | 44 | 6 | 46 | 48 | 6 | 47 | 47 |
| South | T | 20 | 25 | 55 | 23 | 25 | 52 | 22 | 25 | 53 |
| | A | 33 | 8 | 59 | 38 | 10 | 51 | 35 | 9 | 56 |
| | W | 7 | 46 | 47 | 8 | 49 | 43 | 7 | 48 | 45 |
| Total | T | 18 | 28 | 54 | 17 | 27 | 56 | 18 | 27 | 55 |
| | A | 29 | 9 | 62 | 24 | 5 | 71 | 25 | 6 | 69 |
| | W | 7 | 48 | 45 | 7 | 46 | 47 | 7 | 47 | 46 |

In sum, it should be recalled that as an R-square approaches unity the variations among the entities being analyzed are almost totally explained by the set of variables being used for that purpose. At the individual levels "T" and "W," about one-third to one-half of the differences among students in their ACHV is explained by HB and PRCS combined (these figures tend to be somewhat smaller for "T" in the North and for "W" in the South). However, at the "A" level the combination of HB and PRCS explains nearly all the differences among schools in their ACHV levels. These percentages range from 82 in the nonmetropolitan North to about 90 percent for the other areas. Clearly, differences among schools are more fully explained than are differences among individual students.

Table 5.2 presents commonality analyses of type "U" for all three levels of analysis. It is clear that at the two individual levels, "T" and "W," the role of PRCS exceeds that of HB. This is particularly so in the nonmetropolitan North. At the "A" level, however, just the opposite trend prevails. The metropolitan North is unlike the other groups: most of the percentage is in common to the two sets, and the unique values for HB and PRCS are smaller. In summary, at the individual level the role of PRCS exceeds that of HB, and the extent to which it does so is greater in the North than in the South. At the aggregate or school level the role of HB exceeds that of PRCS, and the extent to which it does so is greatest in the metropolitan North, as is the common role. Hence the relative roles of these sets of variables in ACHV are not even roughly similar at the individual and aggregate levels.

## 5.3. COMMONALITY ANALYSES OF FAMILY BACKGROUND VARIABLES AT THE INDIVIDUAL AND SCHOOL LEVEL WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS INCLUDED

In this section we ask: How do the relative roles of HB and PRCS relate to ACHV at the different levels of analysis when RETH is explicitly included in the analyses and classified as an HB variable? The percentage of variation in ACHV accounted for when RETH is brought into the analysis, shown in figure 5.1 under "I," indicates that when the shaded portions are compared for "U" and "I," the magnitude of the increment made by RETH varies by region and level of analysis. The regional increments are most similar at the "W" level, being 2 percent in the metropolitan North and 1 percent elsewhere. At the "T" level the increments are about 9 percent in the South, 6 percent in the metropolitan North, and 3 percent in the nonmetropolitan North. At the "A" level yet another trend emerges, with the increment being 11 percent in the metropolitan South, 9 percent in the nonmetropolitan North, 7 percent in the nonmetropolitan South, and 2 percent in the metropolitan North. We can see, then, that the extent of increase in the explanation of ACHV varies by geographic location and level of analysis.

**Table 5.3.—Commonality Analyses of Family Background Measures for Total (T), Among (A), and Within (W) Differences, When Racial-Ethnic Group Membership Is Included (I), by Geographic Location**

| Region | Level of Analysis | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| | | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | T | 18 | 36 | 46 | 24 | 24 | 52 | 22 | 29 | 49 |
| | A | 41 | 10 | 49 | 19 | 1 | 80 | 24 | 3 | 73 |
| | W | 10 | 49 | 41 | 11 | 43 | 46 | 11 | 45 | 44 |
| South | T | 35 | 19 | 46 | 38 | 21 | 41 | 36 | 20 | 44 |
| | A | 35 | 3 | 62 | 40 | 1 | 59 | 37 | 2 | 61 |
| | W | 12 | 45 | 43 | 12 | 48 | 40 | 12 | 46 | 42 |
| Total | T | 29 | 25 | 46 | 28 | 23 | 49 | 29 | 23 | 48 |
| | A | 33 | 6 | 61 | 25 | 1 | 74 | 28 | 3 | 69 |
| | W | 11 | 46 | 43 | 11 | 44 | 45 | 12 | 46 | 42 |

The commonality analyses in table 5.3 show that the relative roles of HB and PRCS, when RETH is included as an HB variable, differ by geographic location and level of analysis. At the "T" level the role of HB equals or exceeds that of PRCS, except in the nonmetropolitan North. At the "W" level the role of PRCS exceeds that of HB, the extent to which it does so being greatest in the nonmetropolitan North. At the "A" level the role of HB uniformly exceeds that of PRCS by a factor that ranges from about 4 to 1 in the nonmetropolitan North to 40 to 1 in the metropolitan South. Hence, the relative roles of HB and PRCS, when RETH is included as an HB variable, are very different at each of the three levels.

## 5.4. COMMONALITY ANALYSES OF FAMILY BACKGROUND VARIABLES WHEN ACHIEVEMENT IS ADJUSTED FOR RACIAL-ETHNIC GROUP MEMBERSHIP

Finally, we must ask: How do the relative roles of HB and PRCS relate to ACHV when ACHV is first adjusted for RETH? The adjustments are made by means of partial correlation techniques, as described in chapter 1. In figure 5.1, the adjusted R-squares, labeled "A," indicate that the magnitude of the values (both the shaded portions and the plain and shaded portions combined) becomes more nearly comparable. The extent to which the R-squares at the "A" level exceed those at the other two levels is less pronounced, although still large for the adjusted values. It remains least in the nonmetropolitan North.

The commonality analyses in table 5.4 show that the relative roles of HB and PRCS still differ even when adjustments are made for RETH. The role of PRCS uniformly exceeds that of HB for all regions at the "T" and "W" levels; the extent to which it does so is greatest in the nonmetropolitan North. At the "A" level, however, the role of HB continues to exceed that of PRCS, except in the nonmetropolitan North. In these analyses, HB does not exceed PRCS at the aggregate level to as great an extent as in the other two types of analysis. Even here, however, the relative roles of HB and PRCS are not even roughly comparable except in the nonmetropolitan North.

The relative roles of EDPLN and MTVTN were not examined in this chapter because the portions of variations in ACHV uniquely attributable to PRCS at the "A" level were too small to permit meaningful analysis.

## 5.5. SUMMARY

This chapter has shown the differences in the relative roles played by Home Background and Process in the development of Achievement, at both the individual and the school levels. The particular data analysis model employed treated the attributes of the school a student attended as if they were his own attributes. This allowed three different kinds of correlation to be formed: those based on differences among individual students; those based on differences among schools; and those based on differences among students that are unrelated to differences among the schools they attend. These correlations formed the basis for regression and commonality analyses.

The first question addressed in this chapter was, To what extent are ACHV and the various family background measures associated with the schools students attend? This question was answered by observing the squared correlation of each individual student variable with the corresponding mean value for the school. For example, if the correlation between individual student ACHV and average school ACHV is .5, then .5 squared, or 25 percent of the variance in individual student ACHV, is the maximum that can be explained by variables based solely upon differences among schools. For those who are interested in improving the achievement and motivational levels of school age children, the percentages given below indicate the extent to which the schools might serve as a vehicle for bringing about such changes.

| Variable | Percent of Variance of the Variable Associated With the Schools Students Attended |
|---|---|
| Socio-Economic Status (SES) | 26 |
| Family Structure and Stability (FSS) | 12 |
| Racial-Ethnic Group Membership (RETH) | 57 |
| Expectations for Excellence (EXPTN) | 6 |
| Attitude Toward Life (ATTUD) | 16 |
| Educational Plans & Desires (EDPLN) | 9 |
| Study Habits (HBTS) | 10 |
| Achievement (ACHV) | 27 |

Table 5.4.—Commonality Analyses of Family Background Measures for Total (T), Among (A), and Within (W) Differences, When Adjustments (A) Are Made for Racial-Ethnic Group Membership, by Geographic Location

| Region | Level of Analysis | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| | | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | T | 6 | 52 | 42 | 8 | 45 | 47 | 7 | 47 | 46 |
| | A | 2 | 55 | 43 | 12 | 5 | 83 | 9 | 14 | 77 |
| | W | 4 | 57 | 39 | 5 | 52 | 43 | 4 | 54 | 42 |
| South | T | 10 | 42 | 48 | 12 | 42 | 46 | 12 | 41 | 47 |
| | A | 25 | 19 | 56 | 21 | 7 | 72 | 24 | 11 | 65 |
| | W | 5 | 50 | 45 | 7 | 51 | 42 | 6 | 51 | 43 |
| Total | T | 9 | 45 | 46 | 9 | 44 | 47 | 10 | 43 | 47 |
| | A | 16 | 31 | 53 | 17 | 8 | 75 | 17 | 13 | 70 |
| | W | 5 | 53 | 42 | 5 | 52 | 43 | 5 | 52 | 43 |

These figures show that there is a pronounced tendency for students of similar SES, RETH, and ACHV to go to school with one another. Somewhat smaller values are observed for the FSS and the PRCS measures. These same analyses for different geographic groups showed that, for each one of these variables, the values in the South were higher than those in the North. The values in the North were higher for metropolitan than nonmetropolitan areas. Thus, students in the South are more likely to go to school with other students who are similar to themselves in respect to these attributes than are students in the North. This pronounced aggregation of students into schools on the basis of family income and racial-ethnic group suggests that the schools might serve better as a means of effecting social change, through changes in the socioeconomic mix of the student body, than as a means by which changes might be made in students' achievement.

The second question addressed in this chapter was: How do the relative roles of the HB and PRCS measures change at the individual and school level? In order to answer this question comparative analyses were conducted for differences among students (designated "T" for total), differences among schools (designated "A" for among), and differences among students within schools (designated "W," for within). For a "T" analysis, correlations based upon differences among school means are used; and for a "W" analysis, correlations among individual students are used after the corresponding school value has in each case been partialed out by means of partial correlation techniques. For example, a "W" analysis of Achievement would partial school Achievement out of individual student Achievement and then regress these adjusted scores against other individual measures, such as SES. The adjusted scores obtained by this partialing operation are unrelated to (or independent of) differences among schools. The "T" and "W" analyses are referred to as analyses at the individual level while the "A" analyses are called aggregate analyses.

Comparative commonality analyses at all three levels for the HB and PRCS sets are given below. The correlations at the "A" level were usually much larger than at the "T" or "W" level. For example, the squared multiple correlation between ACHV and Family Background was 41 at the "T" level, 31 at the "W" level, and 86 at the "A" level. In order to make analyses at these levels more comparable, the commonality analyses were "unitized" so that the unique and common coefficients sum to 100 for each level of analysis.

| Level of Analysis | Percent Uniquely Attributable to— | | Percent in Common | |
|---|---|---|---|---|
| | HB | PRCS | | |
| T | 18 | 27 | 55 | 1.50 |
| A | 25 | 6 | 69 | .24 |
| W | 7 | 47 | 46 | 6.70 |

These percentages show that the magnitude of the value attributable to PRCS exceeds that of HB by a factor of 1.5 at the "T" level and by a factor of almost 7 at the "W" level. At the "A" level, however, the role of HB exceeds that of PRCS by a factor of about 4 (i.e., the reciprocal of .24). Noticeable also is the much larger percentage in common at the "A" level. Analyses of geographic differences show that similar results prevail for these groups, except that for the "T" and "W" levels the extent to which PRCS exceeds HB is greater in the North than in the South. They also show that, in the metropolitan North, HB exceeds PRCS much more at the "A" level, and the common portion is much greater than for the other geographic groups. Hence the relative roles of these two sets of variables in ACHV are very different at the individual than at the aggregate level.

In the previous chapter a variable that captured differences among students in their Racial-Ethnic Group Membership (RETH) was developed and explicitly incorporated into the analyses. In this chapter the question was posed: How do the relative roles of HB and PRCS change at the different levels when RETH is introduced into the analysis? To answer this question two different types of analyses were conducted. For one type, RETH was explicitly included as an HB variable. For another type, differences in ACHV associated with RETH were eliminated by means of partial correlation techniques, and then analyses were performed on these adjusted ACHV scores. The first type of analysis was called "I" (for "included"), and is given below.

| Level of Analysis | Percent Uniquely Attributable to— | | Percent in Common | PRCS |
|---|---|---|---|---|
| | HB(I) | PRCS | | HB |
| T | 29 | 23 | 48 | .79 |
| A | 28 | 3 | 69 | .11 |
| W | 12 | 46 | 42 | 3.83 |

These analyses show that when RETH is explicitly included as an HB variable the role of HB exceeds that of PRCS at both the "T" and "A" levels but not at the "W" level. At the "A" level the role of HB is more than 9 times greater than that of PRCS, while at the "W" level the role of PRCS exceeds that of HB by a factor of almost 4. At the "T" level, however, the relative roles are more nearly equal, with the role of HB being about 1.3 times greater than that of PRCS. Noticeable also is the enlarged common portion at the A level.

Analyses by geographic location show marked differences in the relative roles for the different levels of analyses. At the "T" level the role of HB equals or exceeds that of PRCS, except in the nonmetropolitan North. At the "W" level the role of PRCS exceeds that of HB; the extent to which it does so is greatest in the nonmetropolitan North. At the "A" level the role of HB exceeds that of PRCS for all regions by a factor that ranges from 4 in the nonmetropolitan North to 40 in the metropolitan South. Consequently, the relative roles of HB and PRCS, when RETH is included as an HB variable, are very different at each level of analysis.

A second way of addressing the question of what happens when RETH is included in the analysis is to adjust out differences in ACHV associated with RETH and then perform commonality analyses. These analyses,[1] called "A" (for "adjusted"), are given below; they are limited to comparisons within racial-ethnic groups.

| Level of Analysis | Percent Uniquely Attributable to— HB(A) | Percent Uniquely Attributable to— PRCS | Percent in Common | PRCS / HB |
|---|---|---|---|---|
| T | 10 | 43 | 47 | 4.30 |
| A | 17 | 13 | 70 | .76 |
| W | 5 | 52 | 43 | 10.40 |

It is clear from this table that when RETH is explicitly set aside, the role of PRCS exceeds that of HB at both the "T" and "W" levels; however, the extent to which it does so is much greater at the "W" level. At the "A" level, though, the role of HB exceeds that of PRCS by a factor of about 1.3. Analyses by geographic location showed somewhat similar trends at the "T" and "W" levels, except that the highest values for HB were in the nonmetropolitan North. Similar results appeared at the "A" level except in the nonmetropolitan North, where the role of PRCS considerably exceeded that of HB. Hence, even when considerations of Racial-Ethnic Group Membership are explicitly set aside, the relative roles of HB and PRCS are not even roughly comparable except in the nonmetropolitan North.

Finally, this chapter has shown that, for differences among students, and for differences among students within schools, the role of PRCS exceeds that of HB except when RETH is included as an HB variable. In this latter case the role of HB slightly exceeds that of PRCS. For differences among schools, however, the role of HB exceeds that of PRCS when RETH is and is not included as an HB variable as well as when RETH is explicitly set aside.

Thus, in explaining the behavior of students and schools very different relative roles in ACHV are played by HB and PRCS. It is suggested that differences in these relative roles at the individual and school level occur because strong relationships between the student's Home Background and Achievement are further accentuated when students are allocated to schools on the basis of their Home Background. These analyses also suggest that even after the role of the school's racial-ethnic composition in Achievement is set aside, the aggregation of students into schools on the basis of their Home Background still figures more importantly than the attitudinal and motivational composition of the student body in explaining differences among *schools* in their levels of Achievement.

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[1] These are the within racial-ethnic group analyses.

## Chapter 6

# FAMILY BACKGROUND, SCHOOL FACTORS, AND ACHIEVEMENT

It has been shown already that family influences on Achievement vary by sex and racial-ethnic group membership as well as by geographic region. We have also seen how the differences among students in their Achievement associated with their Racial-Ethnic Group Membership are related to various family background conditions. In addition, we have examined the manner in which students are allocated to schools, and the implications of this allocation for the relationship between family background variables and Achievement. Here, we shall examine variations in possible school influences for these same groupings of students. The major question is: How do the relative roles of family background (FB) and school (SCH) factors differ for different groups of students? This question is specified in different ways with different sets of variables, depending upon the groups of students under consideration.

### 6.1. VARIATIONS IN ACHIEVEMENT BY FAMILY BACKGROUND, SCHOOL VARIABLES, AND GEOGRAPHIC LOCATION

In this section two questions are addressed. The first is: How do the relative roles of FB and SCH factors in ACHV differ by geographic location? The second is: How do these results change when RETH is entered into the analysis? Racial-Ethnic Group Membership is entered into the analyses in the same manner as in previous chapters, that is, by means of three types of analysis, respectively designated "I," "A," and "U" (see section 4.4.1). To represent FB the same set of variables used in earlier chapters (p. 18) was used once again. Finally to represent possible school influences we selected a subset of 22 school variables. Many more school variables were of course available. But in view of the small number of schools in some of the geographic groups, and our desire to conserve on degrees of freedom and yet be comprehensive in representing important aspects of the school, selectivity was essential. Results from earlier analyses (Coleman et al., 1966; Mayeske et al., 1969) were used as a guide to selection. These analyses had shown that the two most important aspects of a school for Achievement were: (1) the achievement and motivational levels of one's fellow students; (2) various characteristics of the teaching staff. Consequently, the sets of variables pertaining to these attributes were included. The school variables were discussed in chapter 1 (p. 7).

The composition of our 22 variable set (called SCH) is as follows:

1. The set of five variables consisting of the student body's Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, Study Habits, and Achievement. This set was called School Outcomes (SO).

2. The set of 17 school personnel and personnel expenditure variables, including the principal's and teaching staff's Sex, Experience, Training, College Attended, Specialized Staff and Services, Principal's Estimate of the School's Reputation, and the teaching staff's Socio-Economic Background—Localism, Teaching Conditions, Teaching-Related Activities, Preference for Student-Ability Level, Racial-Ethnic Group Membership, and Vocabulary Score.

The number of students and schools included in these analyses is the same as those reported in table 5.1.

The percent of variation in ACHV accounted for by these sets of variables for the different regions and types of analyses is shown in figure 6.1. The same framework for testing the equality of slopes and intercepts that was introduced in chapter 1 (p. 4) was also used here. For almost all analyses the *F* statistic for the slopes and intercepts was 2 or greater, indicating that the groups were sufficiently different to be kept separate. In figure 6.1 the shaded portion of the bar graph depicts the percentage of variation accounted for by the FB and SCH sets combined. Since the percentages accounted for by FB were discussed in the previous chapter we shall focus on the plain portion only. This latter portion depicts the percentage of variation in ACHV uniquely attributable to the SCH set. For our three different types of analysis these plain portions or percentages can be tabulated as follows.

| | Nonmetropolitan | | | Metropolitan | | |
|---|---|---|---|---|---|---|
| | U | I | A | U | I | A |
| North | 6 | 3 | 5 | 8 | 4 | 5 |
| South | 14 | 6 | 8 | 13 | 5 | 6 |

These percentages show that the variation in ACHV attributable to the SCH set is smallest in the North (particularly the nonmetropolitan North) and largest in the South (particularly the nonmetropolitan South). These percentages also show that when "I" is compared with "U" (viz, when RETH is included as an FB variable) a decrement is observed of about 4 percent in the North and of 8 percent in the South. A somewhat smaller decrement can be observed when "A" is compared with "U" (viz, when ACHV is first adjusted for RETH). This latter decrement ranges as follows: nonmetropolitan North, 1 percent; metropolitan North, 3 percent; nonmetropol-

FIGURE 6.1. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND AND SCHOOL MEASURES WHEN RACIAL-ETHNIC GROUP MEMBERSHIP IS EXCLUDED AND INCLUDED, BY GEOGRAPHIC LOCATION

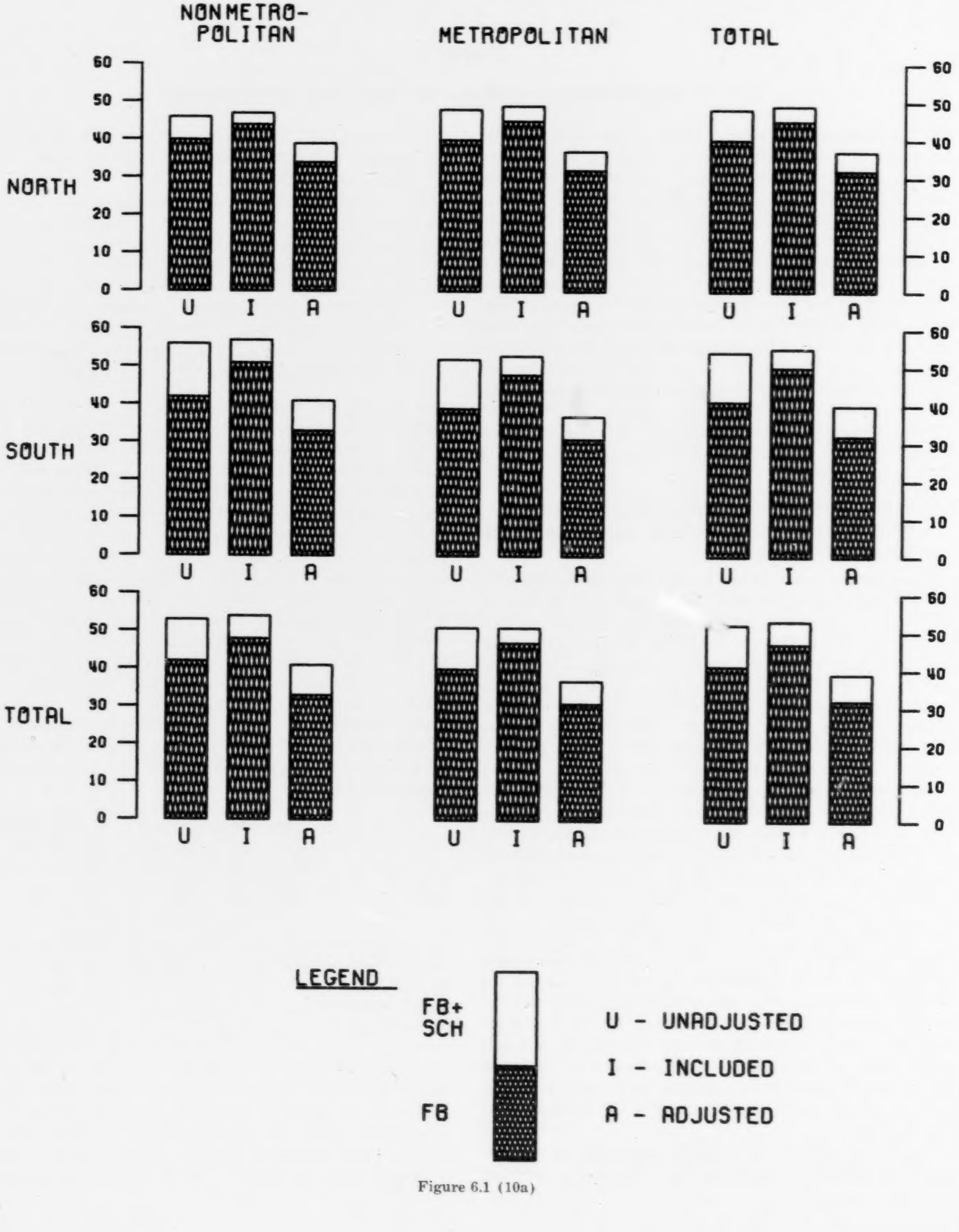

Figure 6.1 (10a)

**Table 6.1.—Commonality Analyses of Family Background and School Variables When Racial-Ethnic Group Membership Is Excluded and Included**

| Region | Type of Analysis[a] | Nonmetropolitan |  |  | Metropolitan |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  |  | FB | SCH |  | FB | SCH |  | FB | SCH |  |
| North | U | 69 | 14 | 17 | 53 | 17 | 30 | 57 | 16 | 27 |
|  | I | 70 | 8 | 22 | 54 | 8 | 38 | 58 | 8 | 34 |
|  | A | 84 | 11 | 5 | 74 | 14 | 12 | 77 | 13 | 10 |
| South | U | 40 | 25 | 35 | 39 | 25 | 36 | 39 | 25 | 36 |
|  | I | 41 | 10 | 49 | 39 | 9 | 52 | 40 | 10 | 50 |
|  | A | 69 | 20 | 11 | 67 | 18 | 15 | 67 | 19 | 14 |
| Total | U | 48 | 22 | 30 | 47 | 20 | 33 | 47 | 21 | 32 |
|  | I | 49 | 11 | 40 | 48 | 9 | 43 | 48 | 10 | 42 |
|  | A | 72 | 19 | 9 | 71 | 16 | 13 | 70 | 17 | 13 |

[a] "U" denotes that ACHV was unadjusted for RETH; "I" that RETH was included as an FB variable; and "A" that ACHV was adjusted for RETH. FB denotes the HB and PRCS variables, while SCH denotes the set of 22 school variables.

itan South, 6 percent; and metropolitan South, 7 percent. Thus the percentage of total variation in ACHV uniquely attributable to the set of SCH variables ranges from about 8 percent in the North to 13 percent in the South. When RETH is included in the analyses, either as an FB variable ("I") or by explicitly omitting it from ACHV ("A"), a decrement in the percentage of variation attributable to SCH occurs. This decrement is greater when RETH is included than when it is explicitly excluded.

Table 6.1 gives commonality analyses of the relative roles of the FB and SCH sets of variables for these same types of analyses after the total R-squares, or percent for FB and SCH combined, have been divided out. This latter operation allows the percentages to sum to 100, thus rendering the results more comparable between groups. Table 6.1 shows that for the "U" analyses (viz, when RETH is not in the analysis as a variable) the role of FB exceeds that of SCH. The extent to which the unique role of FB exceeds that of SCH varies from 4.9 in the nonmetropolitan North through 3.1 in the metropolitan North to 1.6 in the South. Noticeable also are the common portions, which are much larger in the metropolitan North and throughout the South than in the nonmetropolitan North. Just why the role of SCH should be 8 to 11 percentage points larger in the South than in the North is a problem to which we shall return shortly.

Under the "I" type of analysis (viz, when RETH is included as an FB variable), the magnitude of the role for FB increases very little, if at all, over that shown by the "U" analysis. However, the magnitude of the role of SCH decreases while that for the common portion increases. This decrease is on the order of about 8 percent in the North and 15 percent in the South, while the increase in the common portions ranges from about 7 percent in the North to about 14 percent in the South. Clearly, as RETH is included in the analysis the role of SCH decreases, while there is an increase in the role of the common portion, which represents the confounding of possible school and family background influences.

Under the "A" type of analysis (viz, when ACHV is first adjusted for RETH), a somewhat different trend emerges. When "A" is compared with "U" we note that the magnitude of the role of FB increases by about 15 percentage points in the nonmetropolitan North, 21 points in the metropolitan North, and 28 to 29 points in the South. Similarly, the role of SCH drops by about 3 percentage points in the North and by about 6 points in the South. Noticeable also is the marked decrease in the common portion, which ranges from 12 percent in the nonmetropolitan North through 18 percent in the metropolitan North to about 22 percent in the South. Clearly, when RETH is explicitly set aside, the role of FB is greatly enhanced, the role for SCH is slightly diminished, and the confounding of FB and SCH influences is greatly diminished.

These analyses have shown that the magnitude of the role of FB greatly exceeds that of SCH, and that the extent to which it does so is greater in the North than in the South. For the "U" analysis the magnitude of the role attributable to the SCH set is greater in the South than in the North by about 10 percentage points. When RETH is included in the analysis the role of SCH is decreased, particularly in the South, while that of FB is left relatively unchanged. The common portion, or confounding, of FB and SCH influences is increased to a marked extent in the South. For the "A" analysis (viz, when RETH is explicitly omitted) the role of FB is much greater than it is in either the "U" or the "I" analysis, while that of SCH assumes an intermediate position. The role of the portion common to both FB and SCH decreases markedly from the levels reached in the "U" and "I" analyses. Under each type of analysis, however, the role of SCH is greater in the South than in the North.

These results, about which more will be said in the summary at the end of this chapter, suggest that the influence of the schools is related, in part, to the manner in which students are aggregated or allocated into schools. The aggregate effect of allocating students to schools on the basis of their home background may serve to impede the progress that can be made with students in schools that have high concentrations of poor children. This may be due to the large numbers of students who are deficient in basic skills such as reading and mathematics. Indeed, these deficiencies may be schoolwide in nature. Since there is more allocation along these lines in the South, "aggregate effect" is naturally greater there.

## 6.2. VARIATIONS IN ACHIEVEMENT BY FAMILY BACKGROUND, SCHOOL FACTORS, SEX, AND RACIAL-ETHNIC GROUP MEMBERSHIP

In this section the main question addressed is: How do the relative roles of FB and SCH factors in ACHV differ by sex and Racial-Ethnic Group Membership? A corollary question is: How do these results change when RETH is entered into the analysis? This latter question deals with all three types of analysis. Considerations of regional differences are not introduced here because of the small number of schools available for some of the racial-ethnic groups.[1] In order to further conserve on degrees of freedom an even smaller set of SCH variables was used here than in the previous section. However, we continued to use the same five Student Body variables of Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, Study Habits, and Achievement. But we used only 11 variables pertaining to the teaching staff. These were the teaching staff's Experience, Training, College Attended, Sex, Socio-Economic Background, Localism, Teaching Conditions, Teaching-Related Activities, Preference for Student-Ability Level, Racial-Ethnic Group Membership, and Vocabulary Score. The same hypothesis testing framework as before (see chapter 1) was used to test these group differences. To conserve on computer time only differences among the racial-ethnic group totals were tested (i.e., sex differences were not tested). The *F* statistic—a test of differences among groups—showed values of 2 or more.

Figure 6.2 shows the percentage of variation in ACHV accounted for by the FB and SCH measures. The shaded portions represent the percentage of variation accounted for by the FB measures, the shaded and plain portions combined represent the percentage of variation accounted for by both the FB and SCH measures, while the plain portion alone represents the percentage of variation in ACHV that is associated with the SCH set independently of the FB set.

Since the shaded portions in figure 6.2 have been discussed in earlier chapters (see especially chapters 2, 3, and 4) they will not be discussed here. Of special interest, however, is the plain portion, which represents the percentage of variation in ACHV independent of FB that is associated with the SCH set. The group totals in figure 6.2 indicate that this plain portion is much smaller for whites and Oriental-Americans than for the other groups. The percentages for the whites and Oriental-Americans are 4 and 5 percent respectively, while those for the other groups range from 10 percent for Negroes through 11 percent for Indian Americans to 12 percent for Mexican-Americans and Puerto Ricans. When all groups are put in the same framework—the bars labeled "T(U)"—the value for the plain portion is 10 percent. However, when RETH is included as an FB variable—the bars labeled "Total(I)"—or is adjusted for differences in RETH—the bars labeled "Total(A)"—the percentages drop to 5 and 6 respectively.

Comparison of the sex differences shows that the plain portion is slightly greater (1 percent) for female than for male Indians and Oriental-Americans. In the other groups, most males have a slightly higher percentage than the females—2 percent higher for Negroes and Mexican-Americans, and 3 percent higher for Puerto Ricans—while the whites have similar values for both sexes. When the groups are kept in the same framework, however, the plain portion is greater for females than for males by about 3 percent, as can be seen from the bars labeled "Total (U)." When RETH is included as an FB variable—the bars labeled "Total (I)"—or adjusted out —the bars labeled "Total (A)"—these sex differences tend to vanish.

Clearly, the differences in Achievement among Mexican-Americans, Puerto Ricans, Indian Americans, and Negro Americans, that are independent of their family background are more highly related to the attributes of their teachers and fellow students than are these same differences among Oriental-Americans and white Americans. When the different racial-ethnic groups are kept in the same framework and the differences among these groups in their ACHV levels are either included as a family background variable or set aside, the differences in ACHV that remain are less dependent, by a factor of about one-half, on the attributes of their teachers and fellow students than when the groups are kept separate. This is not the whole story, however, for we know that there is a confounding of school and family background attributes as they relate to Achievement. To display this confounding, unitized commonality analyses are given in table 6.2.

The percentages in table 6.2 will be found to differ from those in figure 6.2 because they have all been brought to a common base by the unitizing operation. Another way of saying this is that they focus on the variance "explained" by the two sets, FB and SCH, rather than on the total variance. The figures in table 6.2 show that the percentage uniquely attributable to FB always exceeds that attributable to SCH. However, the role for SCH has a fairly substantial value for groups other than Oriental-Americans and whites. The extent to which FB exceeds SCH (i.e., FB/SCH) for the different groups varies as follows: whites, 7.5; Orientals, 5.6; Negroes, 1.9; Puerto Ricans and Indians, 1.7; and Mexicans, 1.6. When the groups are combined—the row labeled "Total (U)"—FB exceeds SCH by a factor of 2.3. When the differences among the groups in their Achievement levels (RETH) is included as an FB variable—the row labeled "Total (I)"—this factor increases to a value of 5.3. When differences in RETH are set aside—the row labeled "Total (A)"—a somewhat similar value can be observed. The common portions are of particular interest since they represent a possible confounding of school and family background influences. These portions are lowest for Puerto Ricans and whites and largest for Mexican-Americans. When the groups are combined, the common portion

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[1] The numbers of schools used in these analyses are: Indian, 351; Mexican, 621; Puerto Rican, 323; Negro, 670; Oriental, 156; white, 676; total, 923. The numbers of schools for the different groups do not sum to the total because many students (especially nonwhites) from different groups go to the same schools. The number of students is the same as in table 2.1.

FIGURE 6.2. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND AND SCHOOL MEASURES, BY SEX AND RACIAL-ETHNIC GROUP MEMBERSHIP

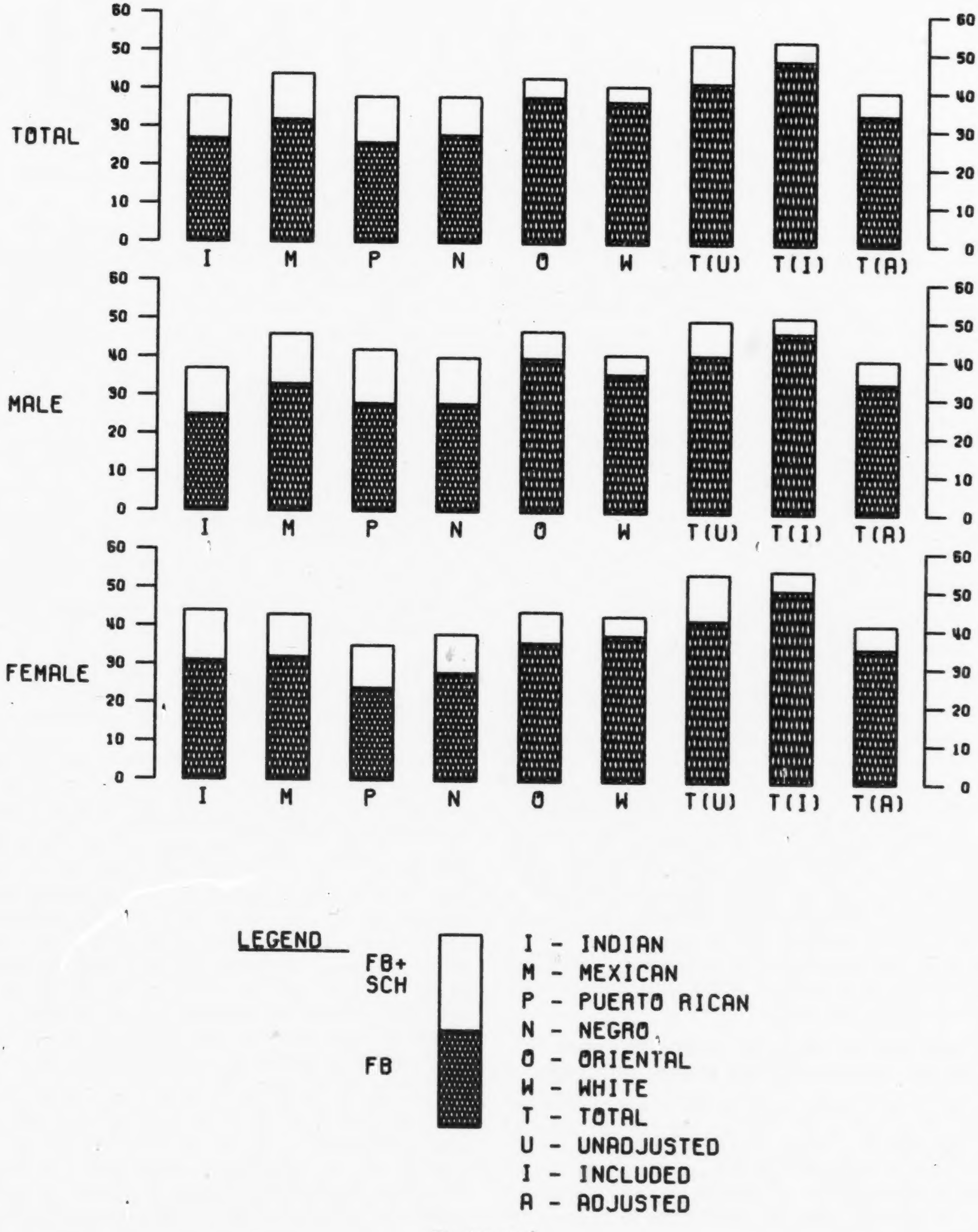

Fig. 6.2 (11a)

**Table 6.2.—Commonality Analyses of Family Background and School Variables, by Sex and Racial-Ethnic Group Membership**

| Group | Total |  |  | Male |  |  | Female |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  | FB | SCH |  | FB | SCH |  | FB | SCH |  |
| Indian | 51 | 30 | 19 | 53 | 31 | 16 | 45 | 31 | 24 |
| Mexican | 43 | 27 | 30 | 44 | 27 | 29 | 42 | 27 | 31 |
| Puerto Rican | 55 | 32 | 13 | 49 | 35 | 16 | 62 | 32 | 6 |
| Negro | 53 | 28 | 19 | 50 | 30 | 20 | 55 | 26 | 19 |
| Oriental | 67 | 12 | 21 | 66 | 16 | 18 | 62 | 16 | 22 |
| White | 75 | 10 | 15 | 74 | 10 | 16 | 76 | 10 | 14 |
| Total (U) | 47 | 20 | 33 | 48 | 18 | 34 | 46 | 21 | 33 |
| Total (I) | 48 | 9 | 43 | 49 | 9 | 42 | 47 | 8 | 45 |
| Total (A) | 71 | 14 | 15 | 70 | 14 | 16 | 72 | 15 | 13 |

increases in value over what it was for any of the individual groups. When RETH is included as an FB variable, the common portion increases by another 10 percent. When RETH is explicity omitted, it drops sharply to a value of 15 percent.

Comparison of sex differences shows that the percentage role of FB is greater for male than for female Indians. For Negroes, whites, and Puerto Ricans, FB has a greater role for females than for males. The largest sex differences in the percentage for SCH occur in the case of Negroes and Puerto Ricans—3 to 4 percent higher, respectively, for males. For the other individual groups the SCH percentages are the same for males as for females. When all groups are combined the role of FB is slightly greater for males than females and that of SCH greater for females than males. When RETH is included as an FB variable, or explicitly set aside, these sex differences tend to diminish.

In summary, then, this section has shown that the relationship of ACHV with SCH that is independent of FB is greater by a factor of 2 to 3 for Puerto Ricans, Indians, Negroes, and Mexican-Americans than for whites and Oriental-Americans. Of course for each group the role of FB exceeded that of SCH, and the extent to which it did so was greatest for whites and Orientals. The confounding of school and family attributes (and their possible influence) was greatest when the different groups were combined, especially when these differences (i.e., RETH) were included as an aspect of family background. When differences among these groups were first set aside, the confounding was greatly reduced and the role of family background greatly augmented.

The next sections examine the relationship of different sets of school variables with ACHV to determine which one plays the greatest role.

## 6.3 COMMONALITY ANALYSES OF STUDENT BODY SOCIAL BACKGROUND AND SCHOOL OUTCOMES

The main question to be addressed in this section and the ones that follow is: How do the sets of variables under consideration relate to ACHV after different aspects of the student's background are taken into account (or adjusted for)? The adjustment, as before, is one of partial correlation. Three different types of analysis are used, as follows:

1. *U-type.* The relationships among the variables are presented without adjusting Achievement (ACHV) for any aspect of the student's background.

2. *HB-type.* The relationships among the variables are presented after first adjusting Achievement for differences among students in their Home Background (HB), that is, in their Socio-Economic Status (SES) and Family Structure and Stability (FSS).

3. *FB-type.* The relationships among the variables are presented after first adjusting Achievement for differences among students in their Home Background (HB) and Process (PRCS). The latter consists of the four variables of Expectations for Excellence (EXPTN), Attitude Toward Life (ATTUD), Educational Plans and Desires (EDPLN), and Study Habits (HBTS).

The results of these analyses are presented when ACHV is adjusted for RETH for each of the three types of analysis. This latter analysis has been designated "Total (A)."

In each section the R-squares for each type of analysis and group are presented graphically, followed by commonality analyses. The R-squares in each figure represent the percent of variation in ACHV accounted for by the sets of variables under consideration after ACHV has been adjusted for the appropriate background variables. Only under a U-type analysis do they represent the percentage of total variation in ACHV accounted for. After ACHV is adjusted for HB or FB, the adjusted ACHV scores are again standardized. This means that for each of the HB-type and FB-type analyses the percentages add to 100 percent. These percentages should *not* be interpreted as those eliminated by the adjustment procedure. These particular percentages can be obtained from figures 2.2 and 6.2 for HB and FB, respectively.

After the R-squares have been presented graphically, unitized commonality analyses of the relative roles of the sets of variables are given for the different types of analysis. For a few groups, particularly the Oriental-Americans, very slight negative commonalities were observed. In order to permit comparisons of the different types of analyses, when these negative common portions

FIGURE 6.3. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY STUDENT BODY SOCIAL BACKGROUND AND SCHOOL OUTCOMES WHEN ADJUSTED FOR FAMILY BACKGROUND VARIABLES, BY SEX

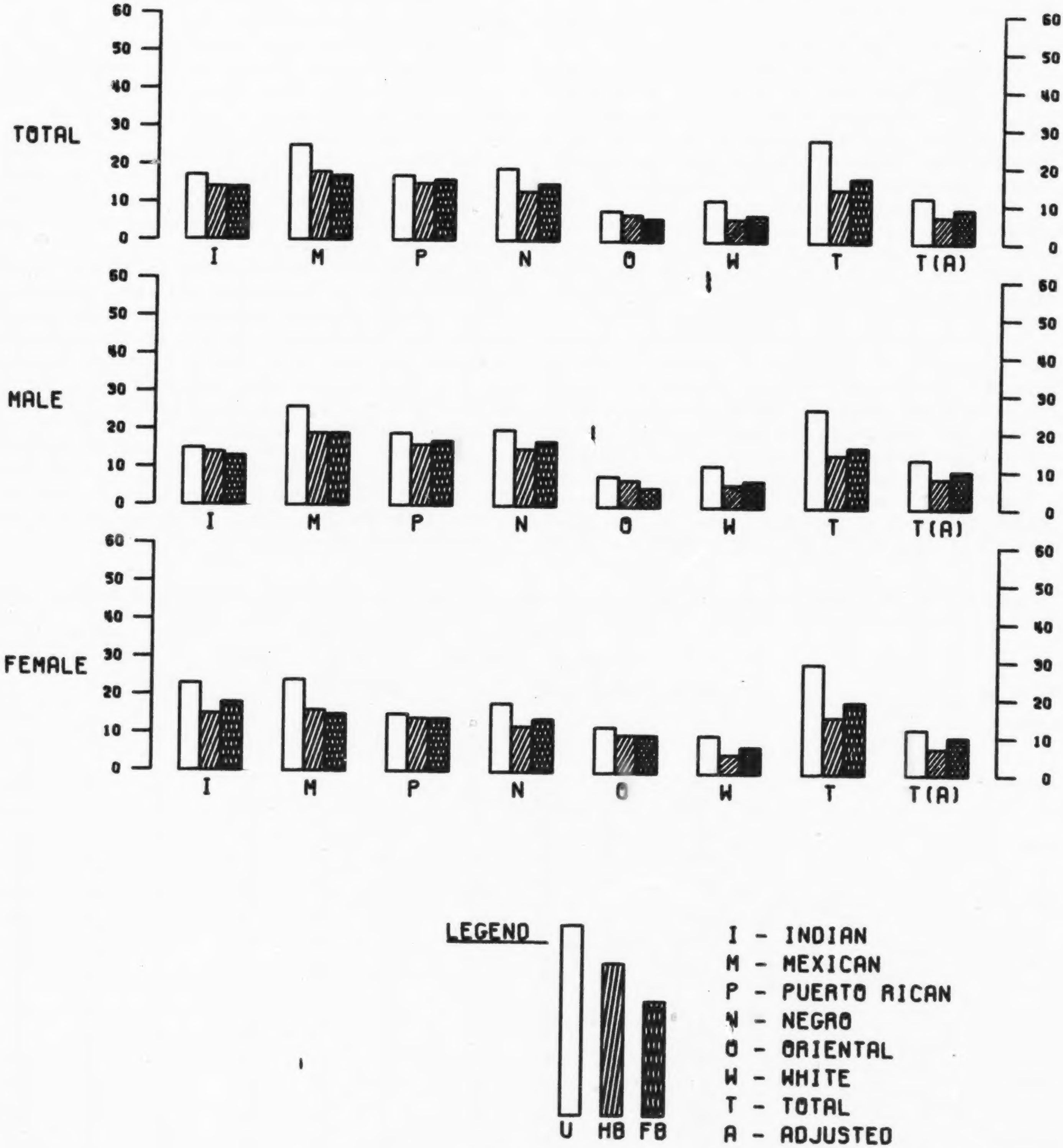

Fig. 6.3 (12a)

occurred they were halved and half added to the unique value for each set. This transformation had the effect of making the new common portion identically zero. In every case of a zero common portion, in the tables that follow, the original value was slightly negative and was transformed so as to be identically zero.

The question addressed in this section is: Which one of the two sets of student body variables, Student Body Social Background or School Outcome, plays the greater role in ACHV after different aspects of the student's background have been taken into account? Student Body Social Background (SBSB) consists of the student body's Socio-Economic, Family Structure, and Racial-Ethnic Composition. School Outcome (SO) consists of the student body's Expectations, Attitude Toward Life, Educational Plans and Desires, Study Habits, and Achievement. The latter set reflects the achievement and motivational mix of the student body. It is called School Outcomes because it represents, in part, the aggregate influence of the school's staff, programs, and facilities.

The percentage of variation accounted for by these two sets of variables for each type of analysis is given in figure 6.3. It will be seen that, for all types of analyses, the R-squares are smallest for whites and Oriental-Americans. Of the other groups, Mexican-Americans have the largest values for the U-type analysis. But as adjustments are made the groups become more similar in their values.

Table 6.3 shows commonality analyses for the different groups. The group totals indicate that, for each group and type of analysis, the role of SO variables surpasses that of SBSB variables, often quite substantially. However, except for Orientals and whites, there is usually a substantial common portion for these two sets of variables. This suggests that to alter the mix of students with regard to either set of variables would serve also to alter their mix with regard to the other set. The sex differences are also noteworthy: they show that, for each group and for almost every type of analysis, the role of SO is greater for males than for females. This tends also to be true, though to a lesser extent, for the role of SBSB. The exceptions here occur primarily for Negroes, but also for Orientals and Puerto Ricans. The only exception to this dominance of SO is to be found among the "Total (A)" analyses, for the type labeled "U." Here, the values for males and females show a marked departure from the total values. However, this trend reverses itself for the other two types of analysis.

In summary, then, this section has shown that, for all racial-ethnic groups and all types of analysis, the role of school outcome variables surpasses that of the student body's social background. The role of school outcome variables also tends to be greater for males than for females. Thus the achievement and motivational mix of the student body plays a greater role in the achievement of individual students than does the student body's social composition. A substantial common portion for most of the groups, but especially for the total, suggested that to change the mix of students with regard to either one of the sets would serve also to change the mix with regard to the other set.

**Table 6.3.—Commonality Analyses of Student Body Social Background and School Outcomes, by Sex and Racial-Ethnic Group Membership**

| | | Total | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Group | ADJ [a] | SBSB | SO | | SBSB | SO | | SBSB | SO | |
| Indian | U | 6 | 47 | 47 | 19 | 67 | 14 | 3 | 29 | 68 |
| | HB | 18 | 68 | 14 | 26 | 74 | 0 | 9 | 50 | 41 |
| | FB | 6 | 59 | 35 | 14 | 74 | 12 | 3 | 43 | 54 |
| Mexican | U | 2 | 20 | 78 | 4 | 26 | 70 | 0 | 13 | 87 |
| | HB | 6 | 36 | 58 | 11 | 42 | 47 | 2 | 25 | 73 |
| | FB | 4 | 44 | 52 | 9 | 50 | 41 | 1 | 33 | 66 |
| Puerto Rican | U | 18 | 53 | 29 | 17 | 53 | 30 | 21 | 50 | 29 |
| | HB | 14 | 56 | 30 | 16 | 62 | 22 | 13 | 48 | 39 |
| | FB | 10 | 60 | 30 | 11 | 63 | 26 | 11 | 55 | 34 |
| Negro | U | 14 | 31 | 55 | 12 | 33 | 55 | 15 | 29 | 56 |
| | HB | 19 | 50 | 31 | 16 | 50 | 34 | 22 | 50 | 28 |
| | FB | 16 | 52 | 32 | 14 | 52 | 34 | 19 | 51 | 30 |
| Oriental | U | 12 | 88 | 0 | 22 | 78 | 0 | 18 | 68 | 14 |
| | HB | 14 | 86 | 0 | 24 | 76 | 0 | 23 | 77 | 0 |
| | FB | 14 | 86 | 0 | 19 | 81 | 0 | 24 | 74 | 2 |
| White | U | 4 | 36 | 60 | 5 | 40 | 55 | 3 | 33 | 64 |
| | HB | 22 | 78 | 0 | 22 | 78 | 0 | 22 | 78 | 0 |
| | FB | 8 | 83 | 9 | 12 | 86 | 2 | 5 | 79 | 16 |
| Total | U | 0 | 13 | 87 | 0 | 16 | 84 | 0 | 11 | 89 |
| | HB | 6 | 34 | 60 | 8 | 39 | 53 | 5 | 29 | 66 |
| | FB | 1 | 36 | 63 | 3 | 42 | 55 | 1 | 30 | 69 |
| Total (A) | U | 9 | 36 | 55 | 40 | 10 | 50 | 32 | 8 | 60 |
| | HB | 24 | 74 | 2 | 25 | 75 | 0 | 22 | 72 | 6 |
| | FB | 10 | 73 | 17 | 14 | 77 | 9 | 7 | 69 | 24 |

[a] "U" denotes no adjustment in ACHV; "HB" that ACHV was adjusted for HB; and "FB" that ACHV was adjusted for FB. "TOTAL (A)" indicates that ACHV was adjusted for RETH. SBSB denotes Student Body Social Background and SO, School Outcomes.

Table 6.4.—Commonality Analyses of Student Body Socio-Economic and Racial-Ethnic Composition, by Sex and Racial-Ethnic Group Membership

| Group | ADJ [a] | Total |  |  | Male |  |  | Female |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  |  | SEC | REC |  | SEC | REC |  | SEC | REC |  |
| Indian | U | 7 | 15 | 78 | 0 | 36 | 64 | 15 | 7 | 78 |
|  | HB | 1 | 48 | 51 | 11 | 72 | 17 | 0 | 36 | 64 |
|  | FB | 1 | 53 | 46 | 7 | 68 | 25 | 0 | 46 | 54 |
| Mexican | U | 11 | 16 | 73 | 9 | 19 | 72 | 13 | 13 | 74 |
|  | HB | 7 | 25 | 68 | 6 | 26 | 68 | 7 | 24 | 69 |
|  | FB | 4 | 33 | 63 | 3 | 36 | 61 | 5 | 30 | 65 |
| Puerto Rican | U | 42 | 0 | 58 | 41 | 0 | 59 | 44 | 1 | 55 |
|  | HB | 36 | 0 | 64 | 39 | 0 | 61 | 34 | 0 | 66 |
|  | FB | 35 | 0 | 65 | 33 | 0 | 67 | 36 | 0 | 64 |
| Negro | U | 69 | 1 | 30 | 62 | 0 | 38 | 76 | 3 | 21 |
|  | HB | 60 | 0 | 40 | 50 | 0 | 50 | 71 | 1 | 28 |
|  | FB | 54 | 0 | 46 | 46 | 1 | 53 | 63 | 0 | 37 |
| Oriental [b] | U | ... | ... | ... | ... | ... | ... | ... | ... | ... |
|  | HB | ... | ... | ... | ... | ... | ... | ... | ... | ... |
|  | FB | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| White | U | 83 | 0 | 17 | 84 | 0 | 16 | 82 | 0 | 18 |
|  | HB | 39 | 20 | 41 | 46 | 15 | 39 | 30 | 28 | 42 |
|  | FB | 52 | 11 | 37 | 42 | 18 | 40 | 58 | 7 | 35 |
| Total | U | 19 | 13 | 68 | 20 | 12 | 68 | 17 | 14 | 69 |
|  | HB | 5 | 39 | 56 | 5 | 37 | 58 | 4 | 42 | 54 |
|  | FB | 5 | 40 | 55 | 4 | 41 | 55 | 5 | 41 | 55 |
| Total (A) | U | 74 | 0 | 26 | 73 | 0 | 27 | 75 | 0 | 25 |
|  | FB | 37 | 13 | 50 | 37 | 12 | 51 | 37 | 13 | 50 |
|  | HB | 31 | 18 | 51 | 26 | 21 | 53 | 35 | 15 | 50 |

[a] "U" denotes no adjustment in ACHV; "HB" that ACHV was adjusted for HB; and "FB" that ACHV was adjusted for FB. "TOTAL (A)" indicates that ACHV was adjusted for RETH. SEC denotes Socio-Economic Composition and REC, Racial-Ethnic Composition.

[b] Data insufficient for analysis.

## 6.4. COMMONALITY ANALYSES OF STUDENT BODY SOCIO-ECONOMIC AND RACIAL-ETHNIC COMPOSITION

The question to be addressed in this section is: Which one of the Student Body Social Background variables plays the largest role in Achievement after different aspects of the students' background have been taken into account? The two Student Body Social Background variables investigated are the Racial-Ethnic and Socio-Economic Composition of the student body.[2] The *R*-squares for these two variables are shown in figure 6.4; "U," "HB," and "FB" are explained on p. 50. It will be seen at once that the R-squares are largest for Mexican-Americans and Negro Americans, and smallest for Oriental-Americans. In fact, the percentages for the latter are zero when different background conditions are taken into account. The largest sex differences in the R-squares are for Indian Americans and Oriental-Americans. For all groups combined (i.e., the total) the percentages tend to be large even after student background conditions are taken into account. These percentages become much smaller, however, after adjustments are made for RETH, as can be seen from the bar labeled "Total (A)."

Table 6.4 displays commonality analyses for these two variables for all three types of analysis. Because the percentage of variation in ACHV associated with these variables for Orientals was very small, the analyses gave rise to large negative commonalities. Consequently, analyses are not presented for them. For the other group totals, Racial-Ethnic Composition (REC) has a large unique role for Indians and Mexicans, while the Socio-Economic Composition (SEC) of the student body has a larger unique role for Puerto Ricans, Negroes, and whites. The large common portions indicate that there is considerable overlap of SEC and REC as they relate to ACHV. In other words, as the proportion of students with high socioeconomic status increases so too does the proportion of white students, and as both of these increase or decrease so too does the achievement level of the individual student. This is so even after allowance has been made for differences in home and family background. Of special interest are the "total" analyses, that is, those for all groups combined, for it is these latter that contain the among- as well as the within-group differences. These analyses show that, for all students, Socio-Economic Composition has a slightly larger role than Racial-Ethnic Composition when aspects of the students' background are *not* taken into account (the U-type analyses). However, as more aspects of the students' background are taken into account (the HB-type and FB-type analyses), the role of SEC is diminished and that of REC increased. When considerations of the individual student's racial-ethnic group membership are first set aside—the analyses labeled "Total (A)"—SEC has a very large role in the

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[2] The family structure composition of the student body was not carried in these analyses. Prior analyses (Mayeske et al., 1969) showed it to be largely dependent upon the socioeconomic composition of the student body.

FIGURE 6.4. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY STUDENT BODY SOCIO-ECONOMIC AND RACIAL-ETHNIC COMPOSITION WHEN ADJUSTED FOR FAMILY BACKGROUND VARIABLES, BY SEX

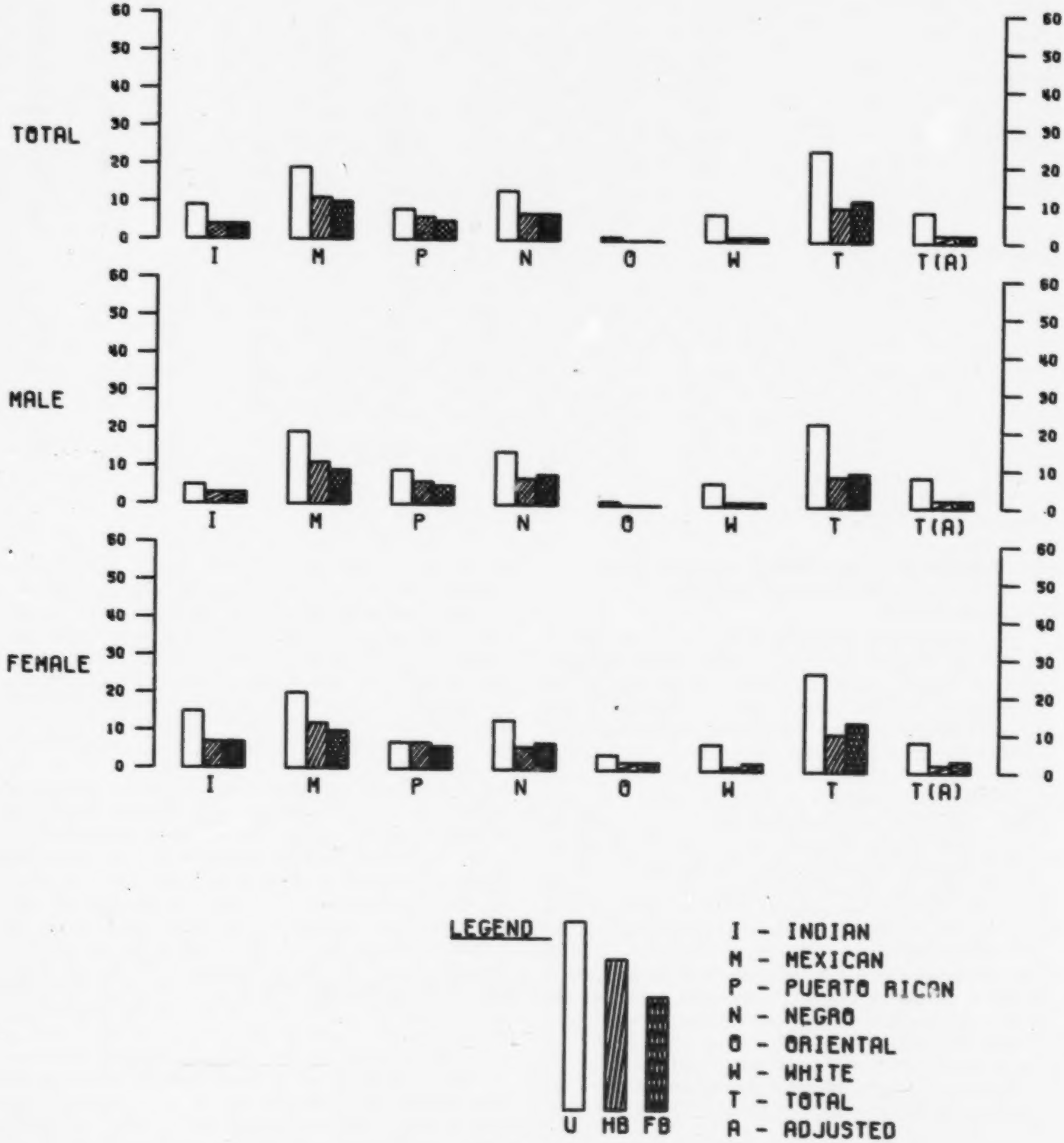

Fig. 6.4 (13a)

**Table 6.5.—Commonality Analyses of Student Body Achievement and Motivation, by Sex and Racial-Ethnic Group Membership**

| | | Total | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Group | ADJ [a] | SACH | SMTV | | SACH | SMTV | | SACH | SMTV | |
| Indian | U | 51 | 3 | 46 | 47 | 12 | 41 | 54 | 1 | 45 |
| | HB | 48 | 14 | 38 | 38 | 24 | 38 | 57 | 11 | 32 |
| | FB | 65 | 28 | 7 | 63 | 37 | 0 | 63 | 26 | 11 |
| Mexican | U | 43 | 1 | 56 | 47 | 1 | 52 | 38 | 1 | 61 |
| | HB | 51 | 2 | 47 | 55 | 3 | 42 | 45 | 2 | 53 |
| | FB | 70 | 14 | 16 | 72 | 15 | 13 | 64 | 13 | 23 |
| Puerto Rican | U | 38 | 19 | 43 | 42 | 21 | 37 | 33 | 13 | 54 |
| | HB | 42 | 27 | 31 | 44 | 34 | 22 | 39 | 17 | 44 |
| | FB | 54 | 41 | 5 | 54 | 46 | 0 | 52 | 33 | 15 |
| Negro | U | 33 | 2 | 65 | 36 | 1 | 63 | 30 | 3 | 67 |
| | HB | 40 | 0 | 60 | 43 | 0 | 57 | 36 | 1 | 63 |
| | FB | 61 | 9 | 30 | 64 | 11 | 25 | 57 | 8 | 35 |
| Oriental | U | 17 | 62 | 21 | 27 | 73 | 0 | 7 | 56 | 37 |
| | HB | 17 | 83 | 0 | 88 | 12 | 0 | 11 | 73 | 16 |
| | FB | 30 | 70 | 0 | 22 | 78 | 0 | 36 | 64 | 0 |
| White | U | 37 | 2 | 61 | 36 | 2 | 62 | 40 | 2 | 58 |
| | HB | 65 | 7 | 28 | 62 | 5 | 33 | 69 | 10 | 21 |
| | FB | 75 | 25 | 0 | 76 | 24 | 0 | 76 | 24 | 0 |
| Total | U | 36 | 0 | 64 | 35 | 0 | 65 | 37 | 0 | 63 |
| | HB | 47 | 3 | 50 | 47 | 2 | 51 | 48 | 4 | 48 |
| | FB | 66 | 13 | 21 | 67 | 14 | 19 | 64 | 13 | 23 |
| Total (A) | U | 36 | 3 | 61 | 36 | 4 | 60 | 37 | 3 | 60 |
| | HB | 54 | 2 | 44 | 53 | 2 | 45 | 55 | 3 | 42 |
| | FB | 74 | 23 | 3 | 77 | 23 | 0 | 72 | 23 | 5 |

[a] "U" denotes no adjustment in ACHV; "HB" that ACHV was adjusted for HB; and "FB" that ACHV was adjusted for FB. "TOTAL (A)" indicates that ACHV was adjusted for RETH. SACH denotes Student Body Achievement Level and SMTV, Student Body Motivation.

U-type analysis, whereas REC has none. As more aspects of the students' background are taken into account—the analyses labeled "HB" and "FB"—the role of REC and of the common portion increase, while that of SEC decreases.

Examination of sex differences shows that the role of SEC tends to be greater for male than for female Indians but for female rather than male Negroes. For the other groups sex differences in the role of SEC are minimal and sometimes inconsistent. The role of REC is larger for male than for female Mexican-Americans. The same is true of Indian Americans, except in the U-type analysis. For the other groups, sex differences in the role of REC are slight, and not always consistent.

The analyses in this section have explored the relative magnitude of the roles played in ACHV by the two student body variables of Socio-Economic and Racial-Ethnic Composition. These analyses showed that REC played a larger role than SEC for Indians and Mexicans, while SEC played a larger role for Puerto Ricans, Negroes, and whites. However, when all racial-ethnic groups were combined, and different aspects of the students' background were taken into account, REC played a larger role than SEC. The common portions were especially large for the nonwhite groups, as well as for all groups combined. The large common portion indicates that these two variables are correlated in their relationship with ACHV, and that changes in one may tend also to result in changes in the other.[3] For example, changing the racial-ethnic mix of schools may also alter their socioeconomic mix.

## 6.5. COMMONALITY ANALYSES OF SCHOOL OUTCOMES

We have already seen that for each racial-ethnic and sex group the unique role of the set of variables called School Outcome (SO) was greater than that of the set called Student Body's Social Background (SBSB). We have also seen that, after different aspects of the individual student's background were taken into account, the Racial-Ethnic Composition of the student body played a greater role in the ACHV of all students combined than did the Socio-Economic Composition of the student body. In this section we go on to ask: Which variables in the SO set play the greatest role in ACHV as different aspects of the student's background are taken into account? To perform these analyses the SO set was separated into two sets. The first set contained a single variable, Student Body's Achievement, or average achievement, called SACH for short. The second set contained the other four SO measures of student body Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires, and Study Habits. This latter set is called the Student Body's Motivation, or SMTV for short.

The *R*-squares for these two sets of variables and three type of analyses are given in figure 6.5. The values are

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[3] The correlation of SEC with REC over all schools for the 9th grade was .68 (Mayeske et al., 1969, p. 111).

FIGURE 6.5. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY STUDENT BODY ACHIEVEMENT AND MOTIVATION WHEN ADJUSTED FOR FAMILY BACKGROUND VARIABLES, BY SEX

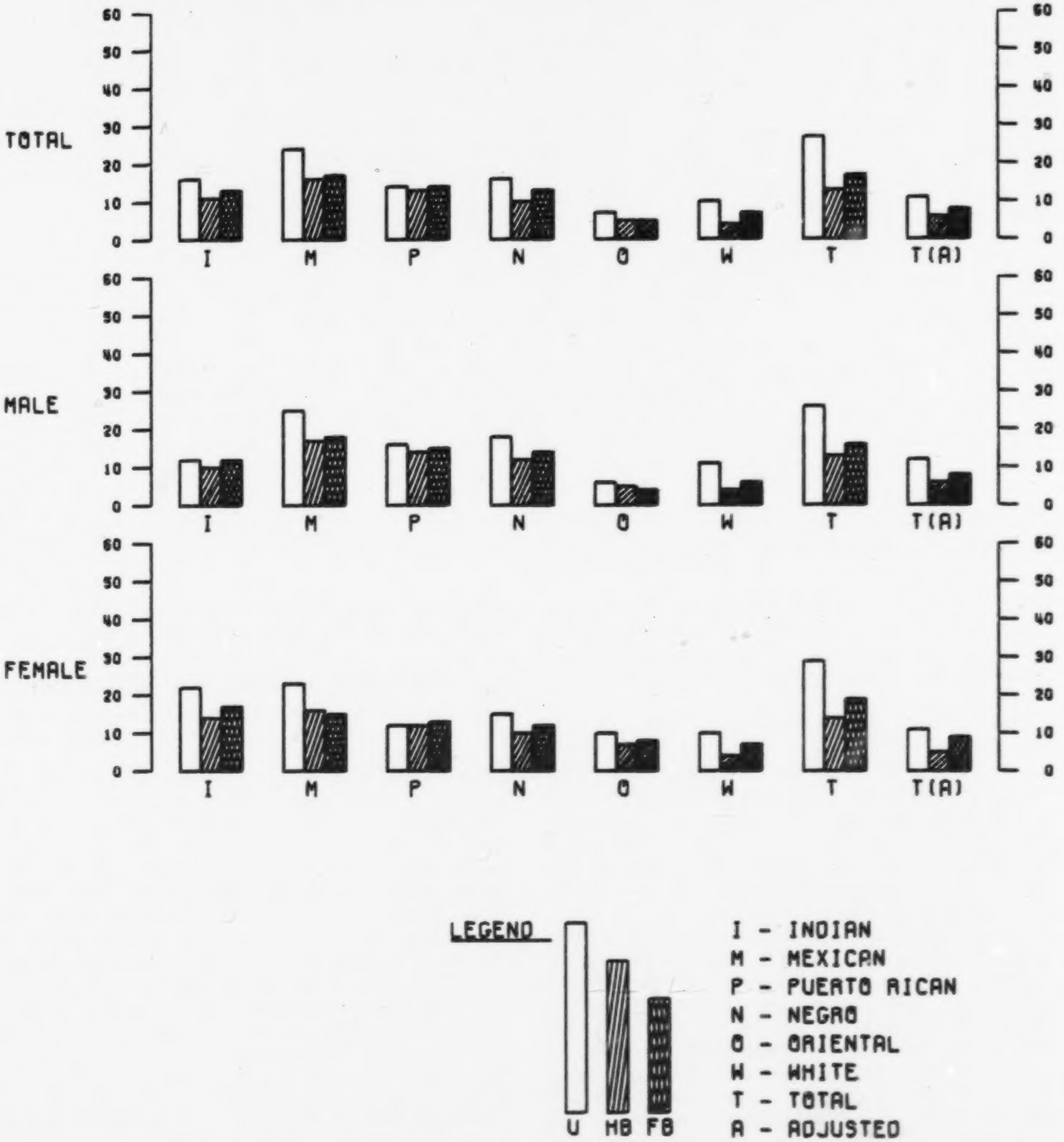

Fig. 6.5 (14a)

greatest, for all types of analysis, for Mexican-Americans and all students combined, and smallest for Oriental-Americans and whites, with the other groups taking on intermediate values. Examination of sex differences shows that values tend to be larger for males than for females except in the case of Mexican and Negro Americans, and the type of analysis labeled "Total (A)," where RETH is explicitly set aside.

Commonality analyses for these two sets of variables, shown in table 6.5, indicate that for each racial-ethnic group other than Oriental-Americans, the unique role of SACH exceeds that of SMTV. For Orientals the reverse is true. For each group as well as for all groups combined there is a tendency for the magnitude of the role of both SACH and SMTV to increase as more aspects of the individual student's background are taken into account. The moderate-to-large common portions for all these groups except Orientals indicate a large degree of interplay or confounding of these two sets as they relate to ACHV.

When sex differences in the relative roles of these two sets of variables are examined it will be noted that, except for Orientals (whose values are somewhat erratic), the role of SACH tends to be greater for male than for female Mexicans, Puerto Ricans, and Negroes, while the opposite is true for Indians, whites, and all groups combined. The role of SMTV is greater for male than for female Indians and Puerto Ricans; values for the other groups are more nearly similar.

In summary, these analyses have shown that for groups other than Oriental-Americans the unique role of SACH substantially exceeds that of SMTV—and to an increasing extent as more aspects of the student's background are taken into account. For Orientals the role of SMTV exceeds that of SACH and the roles of both sets tend to increase as more aspects of the student's background are taken into account. Except for the Orientals, large common portions were observed, which indicates a large interplay or confounding of these two sets of variables as they relate to individual student achievement.

## 6.6. COMMONALITY ANALYSES OF DIFFERENT TEACHER ATTRIBUTES

In section 6.2, 11 variables were used in the school set (SCH) to represent different aspects of the teaching staff. Five of these variables were found in previous analyses to show a relationship with school outcomes such as Achievement. This was true even after the Student Body's Social Background (as defined by its Socio-Economic, Family Structure, and Racial-Ethnic Composition) had been taken into account (Mayeske et al., 1969). These five attributes were the teaching staff's average score on a contextual vocabulary test, racial-ethnic composition, salary and degree levels, preference for working with students of different ability levels, and statement about teaching conditions (viz, the prevalence of disciplinary problems, problems of racial tension, the reputation of the school, the amount of effort that the students put forth to achieve, etc.).

The question posed in this section is: How do these five attributes relate to the achievement levels of different groupings of students when compared with the six other teacher attributes? The different groupings referred to are the same racial-ethnic groups that were used in the earlier sections. The other six teacher variables are the teaching staff's experience, socioeconomic background, localism of background (e.g., locale of school attended), nature of college attended (e.g., public, private, 2-year, university, etc.), involvement in teaching-related activities, and proportion of females on the staff (a detailed description of these variables is given in chapter 1). This latter set of variables will be referred to as the T(6) set, whereas the former will be referred to as the T(5) set.

Figure 6.6 shows the percent of variation in ACHV accounted for by these 11 teacher attributes for our three different types of analyses. Inspection of these R-squares shows them to be larger for nonwhites than for whites for all groups (sex and racial-ethnic) and all types of analyses. Indeed, there is hardly any relationship between ACHV and these 11 attributes for whites, after different aspects of the student's background have been taken into account through "HB" and "FB" analyses. Among the nonwhite groups the percentages are largest for Mexicans and smallest for Orientals and Negroes. When all racial-ethnic groups are combined, and the student's background is not taken into account, the R-squares are larger than for the separate groups. However, when racial-ethnic differences are first set aside, the R-squares for the "U" analyses are some of the smallest obtained.

These results suggest two main conclusions:

1. The ACHV levels of whites are less sensitive to or dependent on the attributes of their teachers than are the ACHV levels of other groups. This is so whether or not the student's background is taken into account (the former result was also obtained in Coleman et al., 1966).

2. Some of the most salient differences in these attributes that are related to ACHV exist between the teachers of white students as opposed to the teachers of the others.

The most notable sex differences in these R-squares are for Indians, Puerto Ricans, and Orientals. For Indians and Orientals the females are more predictable (i.e., have larger percentages) than the males, whereas for the Puerto Ricans the reverse is true.

Table 6.6 gives commonality analyses of the relative roles of these two sets of teacher attributes. Inspection of the unique role of these two sets for each of the groups shows them to vary considerably by group and type of analysis. For Indians, Mexicans, Negroes, and Orientals the role of T(5) consistently outweighs that of T(6) for all types of analyses, although the extent to which it does so is greater for Indians and Mexicans. For whites, the role of T(5) outweighs that of T(6) until different aspects of the student's background are taken into account, and then T(6) takes the lead. For Puerto Ricans the role of T(6) outweighs that of T(5), although the two roles are close together in magnitude. For the two analyses that contain all the racial-ethnic groups together—that is, for Total and Total (A)—the role of T(5) substantially exceeds that of T(6). The large roles of T(5) for these

FIGURE 6.6. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY DIFFERENT TEACHER ATTRIBUTES WHEN ADJUSTED FOR FAMILY BACKGROUND VARIABLES, BY SEX

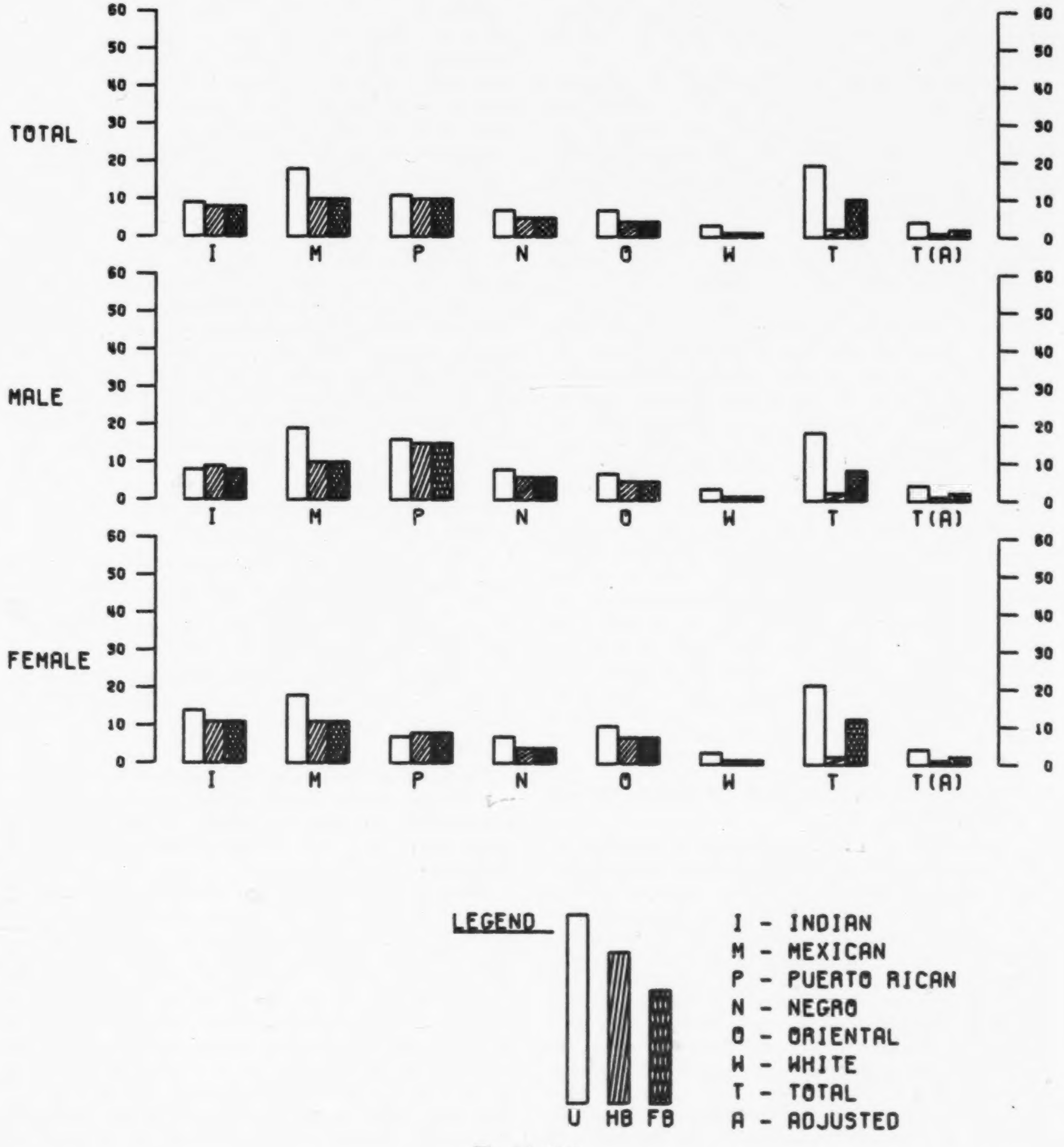

Fig. 6.6 (15a)

**Table 6.6.—Commonality Analyses of Different Teacher Attributes, by Sex and Racial-Ethnic Group Membership**

| | | Total | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Group | ADJ [a] | T(6) | T(5) | | T(6) | T(5) | | T(6) | T(5) | |
| Indian | U | 13 | 85 | 2 | 22 | 78 | 0 | 21 | 67 | 12 |
| | HB | 16 | 81 | 3 | 33 | 67 | 0 | 9 | 79 | 12 |
| | FB | 16 | 81 | 3 | 33 | 67 | 0 | 9 | 79 | 12 |
| Mexican | U | 7 | 69 | 24 | 8 | 64 | 28 | 7 | 76 | 17 |
| | HB | 5 | 72 | 23 | 9 | 62 | 29 | 4 | 83 | 13 |
| | FB | 5 | 72 | 23 | 9 | 62 | 29 | 4 | 83 | 13 |
| Puerto Rican | U | 31 | 27 | 42 | 36 | 19 | 45 | 24 | 50 | 26 |
| | HB | 33 | 27 | 40 | 37 | 15 | 48 | 33 | 60 | 7 |
| | FB | 33 | 27 | 40 | 37 | 15 | 48 | 33 | 60 | 7 |
| Negro | U | 26 | 50 | 24 | 26 | 49 | 25 | 27 | 52 | 21 |
| | HB | 37 | 43 | 20 | 36 | 43 | 21 | 40 | 43 | 17 |
| | FB | 37 | 43 | 20 | 36 | 43 | 21 | 40 | 43 | 17 |
| Oriental | U | 41 | 58 | 1 | 50 | 46 | 4 | 38 | 62 | 0 |
| | HB | 42 | 58 | 0 | 70 | 30 | 0 | 37 | 52 | 11 |
| | FB | 42 | 58 | 0 | 70 | 30 | 0 | 37 | 52 | 11 |
| White | U | 34 | 64 | 2 | 35 | 64 | 1 | 34 | 63 | 3 |
| | HB | 59 | 38 | 3 | 59 | 37 | 4 | 56 | 41 | 3 |
| | FB | 59 | 38 | 3 | 59 | 37 | 4 | 56 | 41 | 3 |
| Total | U | 4 | 76 | 20 | 5 | 75 | 20 | 3 | 78 | 19 |
| | HB | 20 | 76 | 4 | 21 | 74 | 5 | 18 | 79 | 3 |
| | FB | 4 | 84 | 12 | 5 | 83 | 12 | 3 | 85 | 12 |
| Total (A) | U | 27 | 66 | 7 | 28 | 64 | 8 | 26 | 68 | 6 |
| | HB | 19 | 81 | 0 | 19 | 79 | 2 | 19 | 81 | 0 |
| | FB | 21 | 76 | 3 | 18 | 79 | 3 | 20 | 76 | 4 |

[a] "U" denotes no adjustment in ACHV; "HB" denotes that ACHV was adjusted for HB; and "FB" that ACHV was adjusted for FB. "TOTAL (A)" indicates that ACHV was adjusted for RETH. T(6) and T(5) respectively denote the sets of six and five teacher attributes.

latter two analyses indicate that this set is the more important one of the two in explaining differences among students in their ACHV. This is so even after considerations of the student's background, including his racial-ethnic group membership, have been taken into account.

Examination of sex differences shows that the role of T(5) is almost uniformly greater for females than for males, whereas the role of T(6) is almost uniformly greater for males. Negroes form the one exception to this latter assertion. The largest sex differences in the extent to which the role of one set exceeds that of the other are registered by Puerto Ricans and Orientals.

Analyses in this section have shown that:

1. The ACHV levels of whites are less dependent upon or sensitive to their teachers' attributes than are the ACHV levels of other students, even after different aspects of the student's background are taken into account.
2. Some of the most salient differences in the attributes that are related to ACHV exist between the teachers of white students and teachers of others.
3. The set of attributes called T(5) is the one most heavily involved in ACHV for almost all racial-ethnic groups, as well as for all students combined.

## 6.7. COMMONALITY ANALYSES OF SCHOOL OUTCOMES AND TEACHER ATTRIBUTES

In this section we shall investigate the roles played by the set of variables called School Outcome (SO) and the set called T(5) in order to see which one might be more heavily involved in ACHV. Accordingly, the question posed is: What are the relative roles played by the SO and T(5) sets for the different groupings of students? The groupings for the students are the same as those used in previous sections. The R-squares for these variables are given in figure 6.7. Examination of this figure shows that the percentages are largest for Mexican-Americans and smallest for Oriental-Americans and whites, with the other groups taking on intermediate values. The analyses for all groups combined yield the largest values of all. Male Mexicans, Puerto Ricans, and Negroes tend to have larger values, whereas female Indians and Orientals have larger values. A moderate sex difference can also be noted for "Total" analyses, but this difference disappears when adjustments are first made for RETH.

Table 6.7 presents commonality analyses for these two sets of variables. The table shows that, for each racial-ethnic and sex group and for each type of analysis, the role of SO exceeds that of T(5), often to a marked extent. The extent to which it does so is greatest for whites and least for Oriental-Americans. The large common portions for the total analyses indicate that, over all schools and students, there is considerable overlap or confounding of SO and T(5) as they relate to ACHV. When considerations of racial-ethnic group membership are set aside, the role of SO is substantially augmented and that of T(5) is slightly augmented. The common portion, on the

FIGURE 6.7. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY SCHOOL OUTCOME AND TEACHER ATTRIBUTES WHEN ADJUSTED FOR FAMILY BACKGROUND VARIABLES, BY SEX

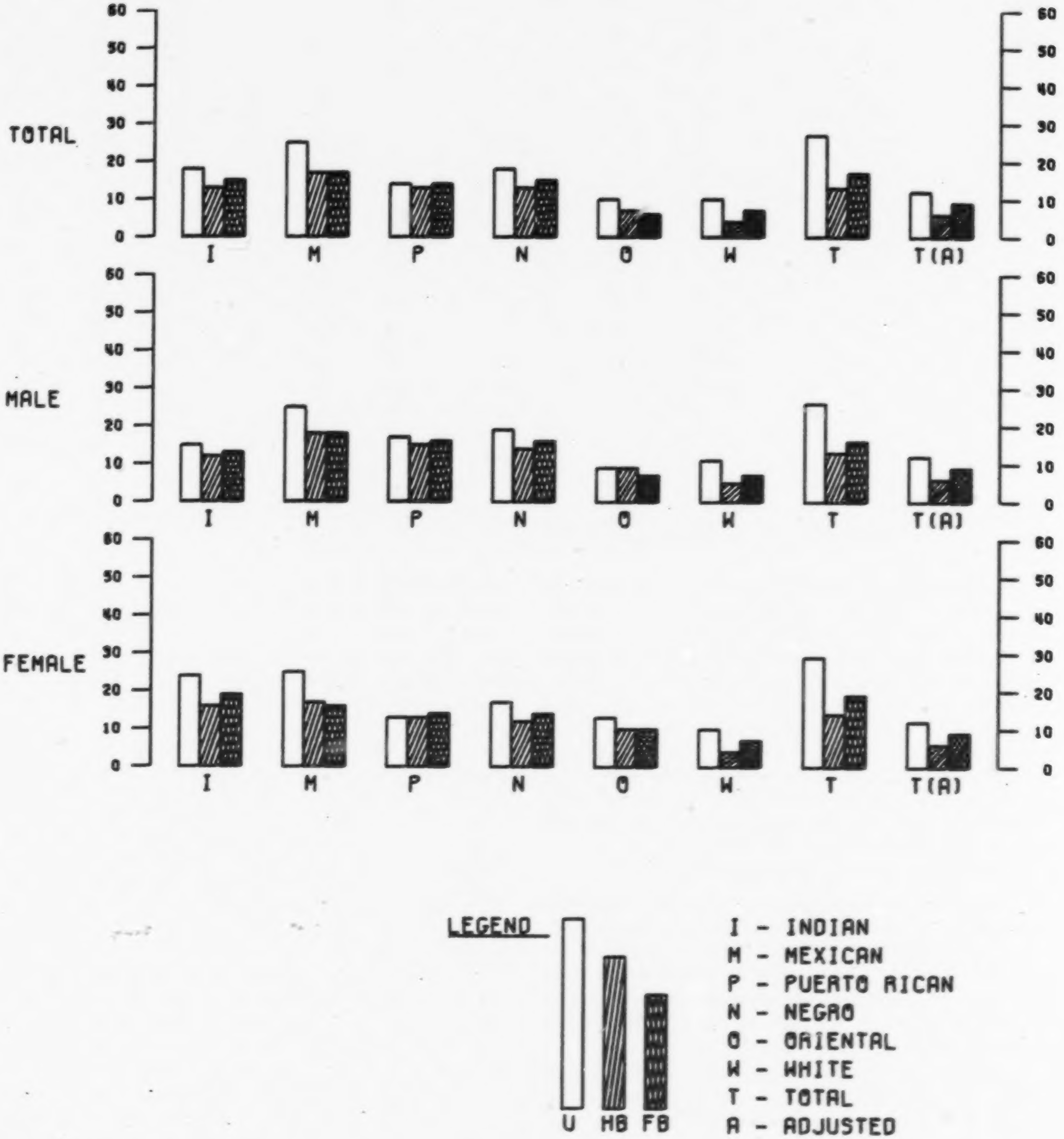

Fig. 6.7 (16a)

**Table 6.7.—Commonality Analyses of School Outcomes and Teacher Attributes, by Sex and Racial-Ethnic Group Membership**

| | | Total | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Group | ADJ [a] | SO | T(5) | | SO | T(5) | | SO | T(5) | |
| Indian | U | 58 | 11 | 31 | 59 | 19 | 22 | 53 | 6 | 41 |
| | HB | 54 | 17 | 29 | 60 | 21 | 19 | 48 | 13 | 39 |
| | FB | 55 | 9 | 36 | 58 | 11 | 31 | 50 | 10 | 40 |
| Mexican | U | 32 | 3 | 65 | 33 | 2 | 55 | 30 | 5 | 65 |
| | HB | 34 | 5 | 61 | 39 | 4 | 57 | 27 | 7 | 66 |
| | FB | 43 | 5 | 52 | 49 | 3 | 48 | 34 | 8 | 58 |
| Puerto Rican | U | 49 | 4 | 47 | 39 | 5 | 56 | 60 | 10 | 30 |
| | HB | 44 | 2 | 54 | 34 | 6 | 60 | 56 | 6 | 38 |
| | FB | 52 | 2 | 46 | 43 | 6 | 51 | 63 | 8 | 29 |
| Negro | U | 71 | 10 | 19 | 69 | 9 | 22 | 71 | 11 | 18 |
| | HB | 78 | 14 | 8 | 76 | 12 | 12 | 80 | 17 | 3 |
| | FB | 79 | 13 | 8 | 77 | 12 | 11 | 81 | 16 | 3 |
| Oriental | U | 58 | 32 | 10 | 60 | 40 | 0 | 54 | 22 | 24 |
| | HB | 69 | 28 | 3 | 60 | 40 | 0 | 62 | 27 | 11 |
| | FB | 69 | 23 | 8 | 65 | 35 | 0 | 55 | 22 | 23 |
| White | U | 81 | 0 | 19 | 82 | 1 | 17 | 80 | 20 | 0 |
| | HB | 92 | 3 | 5 | 94 | 4 | 2 | 90 | 3 | 7 |
| | FB | 96 | 1 | 3 | 96 | 2 | 2 | 95 | 0 | 5 |
| Total | U | 33 | 0 | 67 | 36 | 0 | 64 | 31 | 0 | 69 |
| | HB | 41 | 0 | 59 | 43 | 1 | 56 | 39 | 1 | 61 |
| | FB | 45 | 0 | 55 | 50 | 0 | 50 | 41 | 0 | 59 |
| Total (A) | U | 77 | 4 | 19 | 77 | 4 | 19 | 77 | 4 | 19 |
| | HB | 83 | 6 | 11 | 82 | 6 | 12 | 83 | 7 | 10 |
| | FB | 83 | 3 | 14 | 84 | 4 | 12 | 82 | 2 | 16 |

[a] "U" denotes no adjustment in ACHV; "HB" that ACHV was adjusted for HB; and "FB" that ACHV was adjusted for FB. "TOTAL (A)" indicates that ACHV was adjusted for RETH. SO denotes School Outcomes and T(5), the set of five teacher attributes.

other hand, is substantially decreased. Thus, when considerations of RETH are explicitly set aside, both sets play larger roles in the differences that remain among students in their ACHV.

Examination of sex differences shows that the role of SO is greater for male than for female Indians, Mexicans, Orientals, and whites, and for female rather than male Puerto Ricans and Negroes. For all groups combined, the role of SO is slightly greater for males than for females. However, this difference tends to vanish when considerations of RETH are set aside. The role of T(5) is greater for male Indians and Orientals, and for female Mexicans, Puerto Ricans, and Negroes. Sex differences in the role of T(5) for the other groups are negligible.

We have seen in this section that the SO set played a substantially greater role in ACHV than the T(5) set for all racial-ethnic and sex groups both before and after different aspects of the student's background were taken into account. When considerations of the student's racial-ethnic group membership were set aside, the roles of SO in particular, but also of T(5), were augmented. For all students and schools, a high degree of overlap or confounding was observed for these two sets of variables as they relate to ACHV. There are also sex differences in the roles of these two sets.

## 6.8. SUMMARY

The main question addressed in this chapter was: How do the roles of family background (FB) and school (SCH) factors differ for different groups of students? This question was specified in different ways and with different sets of variables, depending upon the groups of students under consideration.

The first form of the question was: How do the relative roles of FB and SCH factors in Achievement (ACHV) differ by geographic location– A corollary question was: How do these results change when racial-ethnic differences (RETH) are entered into the analysis? In order to represent the individual student's FB the same six variables used in earlier analyses were also used here. These were the student's SES, FSS, EXPTN, ATTUD, EDPLN, and HBTS, as described in chapter 1. In order to represent different aspects of the school a set of 22 variables was used. This set consisted of five variables related to the student body's achievement and motivational levels and 17 variables related to the school's personnel and personnel expenditures (these, too, are described in chapter 1). For each regional group three types of analyses were run. The U-type analysis observed the relative roles of the sets of FB and SCH variables before considerations of RETH were taken into account. The I-type analysis included RETH as an FB variable, while the A-type analysis adjusted ACHV for its association with RETH and then observed the relative roles of FB and SCH. The ratio of the unique role of FB divided by that of SCH is given below for each group and type of analysis.

| | FB/SCH | | | | | |
|---|---|---|---|---|---|---|
| | Nonmetropolitan | | | Metropolitan | | |
| | U | I | A | U | I | A |
| North | 4.9 | 8.8 | 7.6 | 3.1 | 6.8 | 5.3 |
| South | 1.6 | 4.1 | 3.4 | 1.6 | 4.3 | 3.7 |

These ratios show that the role of FB exceeds that of SCH for all types of analysis. The extent to which it does so is greatest when RETH is taken into account. Also, for all types of analysis the role of FB exceeds that of SCH to a greater extent in the North than in the South. However, these ratios do not give the whole picture. The common portions, which may represent a possible confounding of school and family influences, increase in value for the "U" analyses as one moves from the nonmetropolitan North through the metropolitan North to the South. When RETH *is* included the common portions increase, the magnitude of the increase corresponding to this same regional ordering. At the same time the magnitude of the role for SCH decreases, with the magnitude of this decrease being greater in the South than in the North. When adjustments are first made for RETH, the common portions dramatically decrease but remain smaller in the nonmetropolitan North than in the other areas. For each type of analysis, however, the role of SCH factors is greater in the South than in the North. It is conjectured that the pronounced allocation of students into schools on the basis of their socioeconomic and racial-ethnic group membership affects the influence schools may have on their students. It is hypothesized that concentrating large numbers of poor children in the same schools has an aggregate effect that impedes the progress they could normally expect to make (the mechanisms that may be operative will be discussed later). Since this allocation of students into schools on the basis of their social background is more pronounced in the South than in the North it follows that this "aggregate effect" would be greater there.

The second form of the question was: How do the relative roles of FB and SCH factors in ACHV differ by sex and racial-ethnic group membership? A corollary question was, How do these results change when RETH is entered into the analyses? This latter question pertains to the "U," "I," and "A" types of analysis, as outlined earlier. Since there were fewer schools for these subgroups of students than in the prior section, regional analyses were not carried out, and fewer variables were used to represent the school. For these analyses the SCH set consisted of the five variables related to the student body's achievement and motivational levels and the 11 variables pertaining to the teaching staff, a set of 16 variables in all. The unique role of FB divided by that of SCH for these different groups is given below.

These ratios show that for other groups of both sexes, the role of FB is smaller and that of SCH greater than for the whites. Of the other groups the extent to which this is so (viz, the FB/SCH ratio) is greatest for Oriental-Americans. The analyses labeled "U," "I," and "A" behave as in the prior section, with the role of FB exceeding that of SCH more when RETH is taken into account than when it is not taken into account. Some sex differences in these ratios can be noted. Thus the role of FB is greater than that of SCH for Indian and Oriental males and for Puerto Rican, Negro, and white females. The behavior of the male-female totals, where the ratios are greater for males with the "U" and "A" types of analyses and for females with the "I" type, suggests an interaction between RETH and sex. The most noteworthy point of these analyses, however, is that the relationship of ACHV with a set of SCH variables that is independent of FB is greater for Puerto Ricans, Indians, Negroes, and Mexicans than for whites and Orientals. Thus, in explaining differences among students in their ACHV, school factors play a greater relative role for these four groups.

| Group | FB/SCH | | |
|---|---|---|---|
| | Total | Male | Female |
| Indian American | 1.7 | 1.7 | 1.4 |
| Mexican-American | 1.6 | 1.6 | 1.6 |
| Puerto Rican | 1.7 | 1.4 | 1.9 |
| Negro | 1.9 | 1.7 | 2.1 |
| Oriental-American | 5.6 | 4.1 | 3.9 |
| White | 7.5 | 7.4 | 7.6 |
| Total (U) | 2.3 | 2.7 | 2.2 |
| Total (I) | 5.3 | 5.4 | 5.9 |
| Total (A) | 5.1 | 5.0 | 4.8 |

The remaining analyses in this chapter dealt with a network of questions pertaining to the roles that different school factors play in ACHV after different aspects of the student's background have been taken into account. The two major subdivisions of the set of 16 SCH variables are student body and teaching staff attributes. The first part of this network deals with the roles of different student body variables, while the second part deals with the roles of different attributes of the teaching staff. The third part builds upon the results of the first two parts by comparing the roles of a selected set of student body variables with a selected set of teacher attributes. For each of these analyses the relative roles of the sets of variables were examined:

1. Before any aspects of the student's background were taken into account.
2. After adjustments in ACHV had been made for the student's HB factors of SES and FSS.
3. After adjustments had been made for the student's FB factors (viz, HB and PRCS).

In addition, an analysis was run for all groups combined that first made adjustments for RETH. This latter analysis was designated "Total (A)." The results summarized here will deal only with the third type of analysis, that is, with results after adjustment for FB. Results for the other levels are given in the body of the chapter, and will be discussed only when there was a consistent trend across types of analyses.

For the student body analyses the first question asked was: Which one of the two sets of student body variables, SBSB or SO, plays the greater role in ACHV? The SBSB set consisted of the student body's Socio-Economic, Family Structure, and Racial-Ethnic Composition. The SO set was the same set of five variables described earlier. Given below are the results of commonality analyses in the form of ratios of the unique role of SO divided by that of SBSB, after adjustment for the student's FB.

| Group | SO/SBSB | | |
|---|---|---|---|
| | Total | Male | Female |
| Indian American | 9.8 | 5.3 | 14.3 |
| Mexican-American | 11.0 | 5.6 | 33.0 |
| Puerto Rican | 6.0 | 5.7 | 5.0 |
| Negro | 3.3 | 3.7 | 2.7 |
| Oriental-American | 6.1 | 4.3 | 3.1 |
| White | 10.4 | 7.2 | 15.8 |
| Total | 36.0 | 14.0 | 30.0 |
| Total (A) | 7.3 | 5.5 | 9.9 |

These ratios show the extent to which the role of SO exceeds that of SBSB. They show that for every group the unique role of SO substantially exceeds that of SBSB. This is also true of each type of analysis. The extent to which it does so is greatest when all students are combined, and least for Negroes. The sex differences are also noteworthy, for they show that the ACHV levels of female Indians, Mexicans, and whites are more sensitive to the achievement and motivational levels of the students they go to school with (SO) than are those of the males of these same groups. Similarly, Puerto Rican, Negro, and Oriental males show a greater relative sensitivity to SO than do females for these same groups. For all groups, however, there is a pronounced tendency for females to show a greater sensitivity to SO than to SBSB, even after RETH is taken into account. But these ratios do not give the whole story. The large common portions indicate that, overall, to alter the mix of students with regard to either one of these sets would serve also to alter the mix with regard to the other set. These analyses do suggest, however, that the influencing mechanisms reside more in the achievement and motivational levels of the students one goes to school with, independently of one's family background, than in their social composition.

The next question was: Which one of the SBSB variables, SEC or REC, plays the greater role in ACHV? SEC designates the Socio-Economic Composition of the student body, while REC designates its Racial-Ethnic Composition. After ACHV was adjusted for FB, commonality analyses showed that REC played a larger role than SEC for Indians and Mexicans, while SEC played a larger role for Puerto Ricans, Negroes, and whites. However, when all racial-ethnic groups were combined REC played a larger role than SEC. The common portions were especially large for the nonwhite groups, except Orientals, and for all the groups combined. This large common portion indicates that these two variables are correlated in their relationship with ACHV and that, for all schools, changes in one would tend also to result in changes in the other.

The next question was: Which one of the SO variables, SACH or SMTV, plays the greater role in ACHV? SACH designates the student body's achievement level, while SMTV is used to designate the other four variables that pertain to the student body's motivational levels. Commonality analyses for these two sets of variables showed that for each racial-ethnic and sex group except Oriental-Americans and for all groups combined, as well as for each type of analysis, the unique role of SACH substantially exceeded that of SMTV. The extent of these departures, as indicated by the ratio of SACH/SMTV, is shown below.

| Group | SACH/SMTV | | |
|---|---|---|---|
| | Total | Male | Female |
| Indian American | 2.3 | 1.7 | 2.4 |
| Mexican-American | 5.0 | 4.8 | 4.9 |
| Puerto Rican | 1.3 | 1.2 | 1.6 |
| Negro | 6.8 | 5.8 | 7.1 |
| Oriental-American | .4 | .3 | .6 |
| White | 3.0 | 3.3 | 3.2 |
| Total | 5.1 | 4.8 | 4.9 |
| Total (A) | 3.2 | 3.3 | 3.1 |

These values range from a high of 6.8 for Negro Americans to a low of 1.3 for Puerto Ricans. For Oriental-Americans, however, the role of SMTV substantially exceeds that of SACH by a ratio of about 2.5 (i.e., the reciprocal of .4). Examination of sex differences shows that these ratios tend to be larger for females than for males. Thus of the attributes of the students one goes to school with, achievement level plays a greater role than motivational level in individual student achievement. This is so whether or not the student's background is taken into account. This assertion must be qualified to read "except for Oriental-Americans," because for them the motivational levels of the students they attend school with play a greater role than the achievement levels. Also, the achievement of girls shows a greater sensitivity to their fellow students' achievement levels, as opposed to motivational levels, than is the case for boys.

The second part of this network of questions dealt with the magnitude of the role played by different aspects of the teaching staff. Of the 11 teacher variables used, five were shown from earlier analyses (Mayeske et al., 1969) to be related to school outcomes such as Achievement both before and after different aspects of the student's background were taken into account. The question posed here was: What is the magnitude of the role played by this set of five variables when compared with the other six variables? The set of five variables, hereafter called T(5), consisted of the teaching staff's average score on a test of contextual vocabulary, racial-ethnic composition, salary and degree levels, preference for working with students of different ability levels, and view of their teaching conditions. The remaining set of six variables, hereafter called T(6), consisted of the teaching staff's experience, socioeconomic background, localism of schools attended, nature of college attended, involvement in teaching-related activities, and proportion of females on the staff. Examination of the percentage of variation in ACHV accounted for by these 11 variables showed it to be much smaller for whites than for the others, both before and after different aspects of the student's background were taken into account. It was largest of all when the racial-ethnic groups were combined. These results suggest two conclusions:

1. The ACHV levels of other groups are more dependent upon the attributes of their teachers than are the ACHV levels of whites (also observed by Coleman et al., 1966).

2. Some of the most salient differences in these attributes that are related to ACHV exist *between* the teachers of white students and teachers of other students.

Ratios of the relative role of T(5) divided by that of T(6), obtained from commonality analyses after adjusting for FB, are as follows.

| Group | T(5)/T(6) | | |
|---|---|---|---|
| | Total | Male | Female |
| Indian American | 5.1 | 2.0 | 8.8 |
| Mexican-American | 14.4 | 6.9 | 20.8 |
| Puerto Rican | .8 | .4 | 1.8 |
| Negro | 1.2 | 1.2 | 1.1 |
| Oriental-American | 1.4 | .4 | 1.4 |
| White | .6 | .6 | .7 |
| Total | 21.0 | 16.7 | 28.3 |
| Total (A) | 3.6 | 4.4 | 3.8 |

These ratios show that the role of the T(5) set exceeds that of the T(6) set for all groups except Puerto Ricans and whites. This is especially true when all groups are combined, but it also applies when RETH is first put aside. Some marked sex differences are observed in these ratios: the extent to which T(5) exceeds T(6) is greater for females than for males, except for Negroes, for whom the ratios are more nearly equal. These analyses suggest that the set of attributes called T(5) is the one most heavily involved in ACHV for most racial-ethnic groups. The extent of involvement of the T(5) set is greatest, however, when all students are combined. It is this latter grouping for which the percent of variation in ACHV accounted for by teacher attributes is also greatest. Consequently, it is concluded that the most salient teacher differences that are related to ACHV independently of the student's FB exist between the teachers of white and teachers of the other students, and that of these attributes the T(5) set plays the largest role.

The last question built upon the results of the student body and teacher analyses by asking: Which set, T(5) or SO, plays the greater relative role in ACHV? Ratios of the role of SO divided by that of T(5), after adjustments for FB, are given below.[4]

| Group | SO/T(5) | | |
|---|---|---|---|
| | Total | Male | Female |
| Indian American | 6.1 | 5.3 | 5.0 |
| Mexican-American | 8.6 | 16.3 | 4.3 |
| Puerto Rican | 26.0 | 7.2 | 7.9 |
| Negro | 6.1 | 6.4 | 5.1 |
| Oriental-American | 3.0 | 1.9 | 2.5 |
| White | 96.0 | 48.0 | 95.0 |
| Total | 45.0 | 50.0 | 41.0 |
| Total (A) | 27.7 | 21.0 | 41.0 |

These ratios indicate that, for each racial-ethnic group and for males and females, the role of SO exceeds that of T(5), often to a marked extent. The extent to which it does so is greatest for whites and least for Orientals. These results tend to be true also for each type of analysis. Examination of sex differences in these ratios shows that the extent to which SO exceeds T(5) is greater for male than for female Indians, Mexicans, and Negroes, and for female rather than male Puerto Ricans, Orientals, and whites. Analyses for all groups combined showed that over all students and schools there was a high degree of overlap or confounding for these two sets of variables as they related to ACHV. This means that the higher an individuals student's ACHV, independent of his FB, the more likely it is that the students he goes to school with have high levels of achievement and motivation, and that his teachers rank high on variables in the T(5) set.

Analyses in this chapter have shown that:

1. For all geographic, racial-ethnic, and sex differences the role of family background factors in achievement exceeds that of school factors, but the role of school factors independent of family background was greater in the South than in the North, and for other groups than for whites.

2. Those aspects of the school that play the greatest role in achievement, independent of the student's family background, are the achievement and motivational levels of one's fellow students, particularly their achievement, and the attributes of the teaching staff, particularly their verbal skills, racial-ethnic composition, salary and degree levels, preference for working with students of different ability levels, and view of their teaching conditions.

3. Of the attributes of one's fellow students and of one's teachers, the former plays the greater role.

4. Of the achievement-motivational composition and social composition of one's fellow students (as defined by their socioeconomic and racial-ethnic composition) the former plays the greater role, although there is considerable overlap or correlation of the two.

It was conjectured that concentrating large numbers of poor children in the same schools has an "aggregate effect" that impedes the progress that could normally be expected to be made with any individual student. It is suggested that the basic influencing mechanism in this "aggregate effect" is the achievement-motivational mix of one's fellow students rather than their social composition, and that the secondary influencing mechanism is certain attributes of the teaching staff, as described above. The social composition of the students only enters into consideration at all because a student's social background is correlated with his achievement and motivational level. The cycle of poverty begetting poverty may, therefore, perpetuate itself, in part, by virtue of the manner in which students are allocated to schools on the basis of their social background.

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[4] In order to compute the ratios, a 0-value was treated as a 1.

## Chapter 7

## GRADE-LEVEL TRENDS

In this chapter an attempt will be made to compare grade-level trends for the ninth grade with those for other grade levels. Nearly all the latter figures are for sixth- and 12th-grade students; an adequate set of Process measures was not available for third- and first-grade students. As noted in chapter 2, even for the sixth grade these measures are not as comprehensive as they are at the ninth and 12th grades. For the latter, however, the measures are identical.

We will make three different kinds of comparisons, according to the type of analysis under consideration. In the first kind, we will merely observe the grade-level trends when the indices are correlated with Achievement. In the second, we will observe the grade-level trends for the percentages of variation (R-squares) and the results of commonality analyses. Finally, we will compare the stability over the different grade levels in the ratio of the unique commonality coefficient for one set of variables to its stability for another set of variables. Since this will be the type of comparison most frequently used, the precise meaning of this ratio should be explained here. Roughly speaking, it can be interpreted in one of three ways:

If the ratio is greater than 1, it means that the unique value for the set in the numerator exceeds that for the set in the denominator; the larger the ratio, the greater is the extent to which it does so.[1]

If the ratio approximates 1, it means that the relative roles of the two sets of variables are on a more nearly equal footing in their relationship with the dependent variable.

If the ratio is less than 1, it means that the unique value for the set in the numerator is smaller than that in the denominator; the smaller the ratio, the greater is the extent to which it is so.

Table 7.1 shows the percentages of students and schools, by grade level and area, included in the analyses. These percentages are larger for the metropolitan North and nonmetropolitan South than for the other areas. Table 7.2 shows the percentages of students and schools by racial-ethnic group and (male) sex. Close inspection of this latter table suggests two cautions that must be observed in making inferences about grade-level trends. The first caution pertains to the increasing percentage of white and Oriental-American students at the higher grade levels and the decreasing percentages of students from the other groups. This trend strikingly reflects the greater incidence of dropouts among Indians, Mexican-Americans, Puerto Ricans, and Negroes. Hence, we are dealing with very different populations at the different grade levels, with all that this implies. The second caution pertains to the slightly greater proportion of males than females among Indians, Mexican-Americans, Puerto Ricans, and Oriental-Americans. Evidently, a small pro-

**Table 7.1.—Percent of Students and Schools, by Geographic Location and Grade Level**

| | | Non-Metropolitan | | Metropolitan | | Total | |
|---|---|---|---|---|---|---|---|
| Region | Grade | $P_N$ | $P_n$ | $P_N$ | $P_n$ | $P_N$ | $P_n$ |
| North | 12 | 12 | 19 | 51 | 20 | 63 | 39 |
| | 9 | 12 | 17 | 51 | 27 | 62 | 44 |
| | 6 | 13 | 18 | 45 | 34 | 58 | 52 |
| South | 12 | 24 | 50 | 12 | 11 | 37 | 61 |
| | 9 | 25 | 44 | 13 | 11 | 38 | 55 |
| | 6 | 29 | 37 | 14 | 11 | 42 | 48 |
| Total | 12 | 37 | 69 | 63 | 31 | 96,426 | 780 |
| | 9 | 36 | 62 | 64 | 38 | 133,136 | 923 |
| | 6 | 41 | 55 | 59 | 45 | 123,306 | 2,370 |

NOTE.—$P_N$ denotes the percent of total students, $P_n$ the percent of total schools. Because of rounding, percentages do not always add to 100.

**Table 7.2.—Percent of Students and Schools, by Racial-Ethnic Group Membership and Grade Level**

| | Percent of Students From Group | | | Percent Male In Group | | | Percent Schools For Group | | |
|---|---|---|---|---|---|---|---|---|---|
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 3 | 2 | 2 | 55 | 54 | 55 | 31 | 38 | 27 |
| Mexican | 7 | 5 | 3 | 58 | 58 | 54 | 53 | 67 | 49 |
| Puerto Rican | 3 | 3 | 2 | 58 | 51 | 50 | 29 | 35 | 23 |
| Negro | 28 | 29 | 26 | 47 | 48 | 46 | 55 | 73 | 67 |
| Oriental | 1 | 1 | 2 | 56 | 52 | 54 | 12 | 17 | 12 |
| White | 57 | 60 | 66 | 51 | 51 | 50 | 77 | 73 | 66 |
| Total | 118,106 | 128,108 | 94,096 | 51 | 51 | 49 | 2,370 | 923 | 780 |

NOTE.—Because of rounding, the percentages for students do not always add to 100. The percentages for schools do not add to 100, since many students from different groups attend the same schools.

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[1] A 0 unique value was set equal to 1.

portion of the females in these groups either identified themselves as "Other" on the racial-ethnic question or failed to respond to that question at all. In addition, a higher proportion of those who failed to identify themselves by sex have been females.

## 7.1. GRADE-LEVEL TRENDS IN THE ROLES OF FAMILY BACKGROUND FACTORS

The first grade-level comparisons to be made are the correlations of the individual Home Background and Process variables with Achievement, for the different groups. These are given in graphic form in figure 7.1. Correlations are also given for a "Total (A)" group. These are the correlations of each variable with Achievement (ACHV) after Racial-Ethnic Group Membership has been partialed out.

The grade-level trends for Socio-Economic Status (SES) in figure 7.1 show increases at the higher grade levels for Indians and Negroes, and decreases for Mexican-Americans, Puerto Ricans, and Oriental-Americans. The trends oscillate slightly for whites as they also do after adjustments are first made for Racial-Ethnic Group Membership. However, they remain much the same when all groups are combined. For all groups and grade levels, then, SES plays a fairly substantial role in explaining ACHV, although the variations are considerable.

For Family Structure and Stability (FSS), on the other hand, there is a tendency for the correlations to get progressively smaller at the higher grade levels. This is so for all groups—a decline that may represent, in part, the loss of students at the higher grade levels from the less intact families. For Expectations for Excellence (EXPTN) the correlations with ACHV increase at the higher grade levels for Indians, whites, all groups combined (T), and for analyses after RETH has been adjusted out. For the other groups, EXPTN shows a decreasing value for Mexican-Americans and Puerto Ricans, a fairly constant value for Oriental-Americans, and an oscillating value for Negroes. Evidently, these changes reflect changes not only in the composition of the students (and hence the student indices) at the different grade levels, but also in the structure of Expectations for Excellence for those students that remain. For Attitude Toward Life (ATTUD) the correlations with ACHV oscillate around the ninth-grade values for most groups; an exception occurs for Oriental-Americans. Educational Plans and Desires (EDPLN) tends to increase in value at the higher grade levels for Negroes and whites and for all groups adjusted for RETH; it is a more stable value for all groups combined. For the other groups, Study Habits (HBTS) shows smaller values at the higher grade levels—a decline undoubtedly due in part to the changing composition of the students by grade. For all groups, the largest correlations at all grade levels tend to occur for EDPLN and SES. For the other variables, there is a tendency for the magnitude of the correlations to vary by group and grade level.

The subject of the next set of comparisons is the stability in the relative roles of SES and FSS in ACHV, by grade. These ratios are shown in table 7.3. It will be seen that, for groups other than Oriental-Americans, there is an increasing tendency at the higher grade levels for the role of SES to exceed that of FSS. As noted earlier, most of these changes are probably due to the higher incidence of dropouts among the lower SES and lower FSS students at the higher grade levels. For Oriental-Americans, however, the role of SES diminishes at the higher grade levels relative to that of FSS. However, the role of SES relative to that of FSS decreases at the higher grade levels for males, and oscillates for females. For most groups at all grade levels the ratios *tend* to be greater for females than for males, which indicates that FSS plays a greater role for males than for females. The magnitude of the ratios at the sixth-grade level suggests that, had we chosen sixth-grade rather than ninth-grade students as our primary group, we would have attributed a larger role to FSS for most of these groups. Similarly, had we chosen the 12th grade as the primary group, we would have attributed an even smaller role to FSS for most of these groups.

The third set of comparisons concerns the stability in the relative roles of PRCS and HB in ACHV, by grade. Table 7.4 shows that for most group totals PRCS tends to play an increasingly greater role at the higher grade levels. The exceptions are for Indians and Negroes, for whom the relative roles oscillate from low at the sixth

Table 7.3.—Grade-Level Trends in the Roles of Socio-Economic Status and Family Structure, by Sex and Racial-Ethnic Group Membership

| | SES/FSS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 1.2 | 4.3 | 83.0 | .8 | 1.5 | 25.0 | 2.1 | 14.4 | 91.0 |
| Mexican | .8 | 1.7 | 6.5 | .9 | 1.2 | 8.1 | .8 | 3.5 | 4.6 |
| Puerto Rican | .5 | 2.1 | 78.0 | .6 | 2.4 | 4.2 | .5 | 1.8 | 7.3 |
| Negro | 8.6 | 41.5 | 92.0 | 6.5 | 26.3 | 90.0 | 13.7 | 43.0 | 93.0 |
| Oriental | 1.0 | .9 | .8 | .8 | .9 | .4 | 1.2 | .9 | 1.9 |
| White | 16.2 | 41.0 | 90.0 | 15.8 | 39.5 | 90.0 | 21.0 | 85.0 | 44.5 |
| Total | 5.2 | 13.6 | 26.3 | 4.5 | 11.0 | 26.3 | 6.8 | 17.8 | 26.3 |
| Total (A)[a] | 9.0 | 26.6 | 90.0 | [b] | 19.0 | 90.0 | [b] | 42.0 | 90.0 |

[a] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

[b] Not available.

FIGURE 7.1. - STRUCTURAL AND BEHAVIORAL CORRELATES OF ACHIEVEMENT, BY RACIAL-ETHNIC GROUP AND GRADE LEVEL

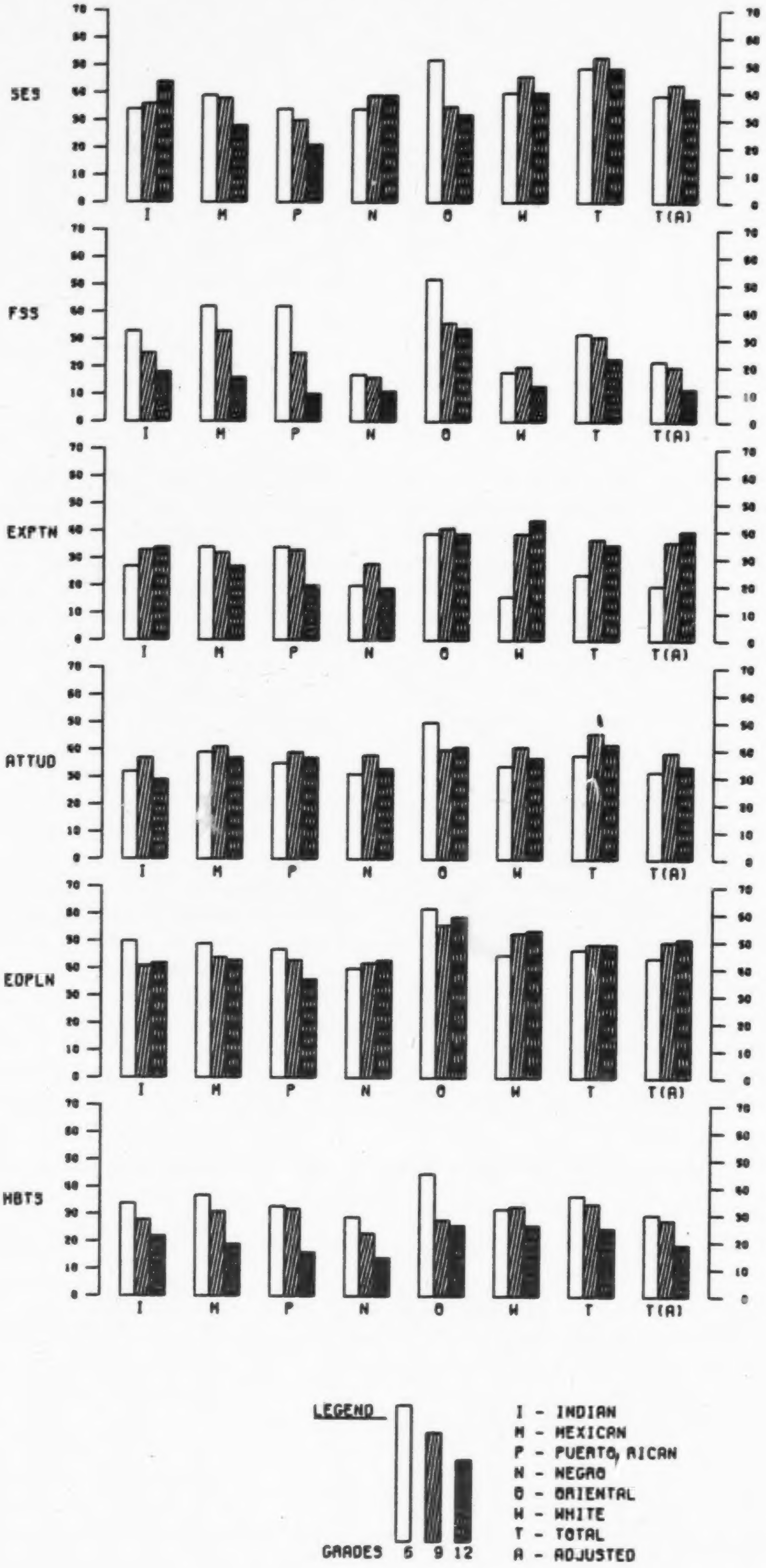


Fig. 7.1 (17a)

**Table 7.4.—Grade-Level Trends in the Roles of Home Background and Process Measures, by Sex and Racial-Ethnic Group Membership**

| Group | PRCS/HB | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 2.4 | 3.1 | 1.2 | 2.5 | 10.0 | 3.1 | 2.0 | .9 | .4 |
| Mexican | 1.1 | 3.3 | 11.2 | 1.4 | 2.6 | 38.0 | .8 | 1.9 | 2.5 |
| Puerto Rican | 1.2 | 11.0 | 19.5 | 1.5 | 6.0 | 22.3 | .8 | 32.5 | 10.6 |
| Negro | 1.8 | 2.3 | 2.0 | 2.3 | 3.0 | 2.7 | 1.4 | 1.8 | 1.7 |
| Oriental | 1.5 | 6.1 | 14.5 | 1.4 | 4.0 | 8.5 | 1.8 | 14.5 | 23.7 |
| White | 2.3 | 4.3 | 9.7 | 3.0 | 6.3 | 9.5 | 1.6 | 3.4 | 9.7 |
| Total (U)[a] | .9 | 1.4 | 2.2 | 1.2 | 2.1 | 2.8 | .6 | 1.0 | 1.6 |
| Total (I)[b] | .4 | .7 | 1.0 | [c] | 1.0 | 1.2 | [c] | .6 | .8 |
| Total (A)[d] | 1.8 | 4.3 | 8.0 | [c] | 5.0 | 8.1 | [c] | 2.9 | 6.8 |

[a] Total when Racial-Ethnic Group Membership is not included in the analyses.

[b] Total when Racial-Ethnic Group Membership is included as a Home Background variable.

[c] Not available.

[d] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

grade to high at the ninth grade, decreasing again at the 12th grade. These trends are modified by sex differences for some of the groups. For example, at the higher grade levels, Indian males show an oscillatory trend whereas Indian females show a decreasing trend; Puerto Rican males show an increasing trend whereas females show an oscillatory trend; and Negroes of both sexes show an oscillatory trend. A tendency can be noted at all grade levels and for most groups for the ratio to be greater for males than for females. This indicates that PRCS plays a greater role relative to HB for males than for females. The exceptions are Oriental-Americans, for whom the reverse is true, and Puerto Ricans, who tend to be inconsistent in this respect. For most groups and grade levels, however, we can conclude that PRCS plays a large role relative to that of HB—in fact, PRCS usually exceeds it. The major exception is when RETH is included as an HB variable. Here the role of HB tends to exceed that of PRCS for females, and to equal it for males.

The next comparison to be made is between the relative roles played in ACHV by EDPLN, on the one hand, and MTVTN, on the other, after adjustments are made in ACHV for HB. The ratio that provides the basis for this comparison is formed of the unique commonality coefficient for MTVTN (which, it will be recalled, consists of the other three PRCS measures of EXPTN, ATTUD, and HBTS) divided by that for EDPLN. The complete set of ratios, shown in table 7.5, indicates that for Indians, Puerto Ricans, whites, and all groups combined after adjustments are made for RETH, the role of MTVTN relative to that of EDPLN increases at the higher grade levels. For Mexican-Americans and Negroes, however, there is an oscillating trend: the role of MTVTN increases at the ninth grade to drop again at the 12th. For Oriental-Americans and for all groups combined *without* adjustment for RETH, it appears that there are sex differences in the grade-level trends. For Oriental males the role of MTVTN oscillates, whereas for females it increases at the higher grade levels. For the "Total" group, the role of MTVTN increases at the higher grades, while for females it oscillates. For most of the groups, however, there is a tendency for the role of MTVTN to exceed that of EDPLN to a greater extent for females than for males. Admittedly, if we had chosen the sixth grade as the primary level for analysis over all groups, we would have attributed a somewhat greater role to EDPLN than would have been the case at the ninth or 12th grade. Of course, it might have been misleading to

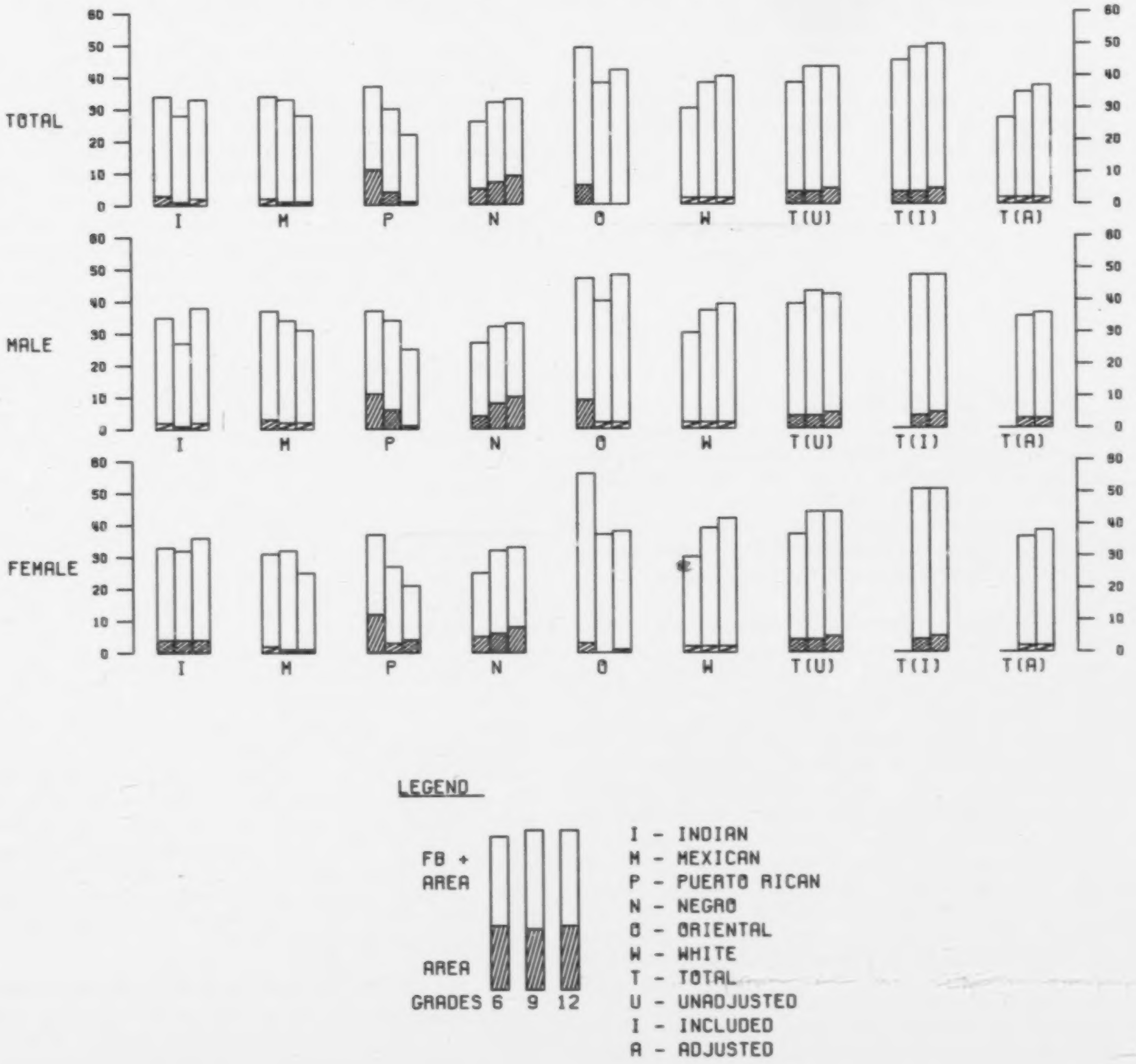
**Table 7.5.—Grade-Level Trends in the Roles of Educational Plans and Other Motivational Measures, by Sex and Racial-Ethnic Group Membership**

| Group | MTVTN/EDPLN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | .1 | 1.7 | 2.7 | .1 | .9 | 2.9 | .1 | 3.9 | 20.3 |
| Mexican | .1 | 1.7 | 1.1 | .1 | 1.2 | 1.1 | .1 | 3.1 | 1.6 |
| Puerto Rican | .1 | 1.4 | 2.5 | .1 | .8 | 3.2 | .1 | 3.0 | 4.0 |
| Negro | .2 | 1.3 | .8 | .1 | 1.0 | .9 | .4 | 1.8 | .7 |
| Oriental | .1 | .4 | .4 | .1 | .3 | .2 | .3 | .7 | 1.6 |
| White | .3 | 1.1 | 1.4 | .2 | .7 | 1.2 | .4 | 1.4 | 1.9 |
| Total | .2 | 2.0 | 2.3 | .1 | 1.2 | 1.9 | .4 | 3.8 | 3.8 |
| Total (A)[a] | .1 | .9 | 1.1 | [b] | .6 | 1.0 | [b] | 1.2 | 1.4 |

[a] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

[b] Not available.

FIGURE 7.2. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY AREA OF RESIDENCE AND FAMILY BACKGROUND, BY SEX AND RACIAL-ETHNIC GROUP MEMBERSHIP



do this for the sixth grade, since EDPLN is still developing at that stage. Indeed it may be that these changes from the sixth to ninth grade in the relative roles of these two sets of variables represent, in part, a change in the development of EDPLN determined to some degree by a combination of the student's HB and ACHV.

The next set of analyses attempts to summarize grade-level trends by area of residence. To do so, a somewhat different analytic framework is adopted from the one used in chapter 3 and appendix B. There, comparisons were made between the mean or average ACHV of students in northern and southern metropolitan and nonmetropolitan areas. But to have attempted a similarly comprehensive set of comparisons for the various grade levels would have resulted in an unwieldy mass of data. Accordingly, we used a different analytic framework that reduced the number of comparisons while at the same time allowing for a finer differentiation by geographic area. The north-south and metropolitan–nonmetropolitan classifications were replaced by two variables that encompassed a greater range of diversity. Thus, in lieu of the north-south classification we used a variable that captured differences between North, Far West, and South. To develop this variable, States falling in the South classification, as described in chapter 1, were scored lowest, those falling in the Far West were given an intermediate values, and those that remained (i.e., the northern States not classified as Far West) were assigned the highest value. These relative values tended to correspond to the relative ACHV means attained by these three groups (Okada et al., 1969). The second variable contained seven categories pertaining to degree of urbanization; they were coded as follows:

| Scale value | Location |
|---|---|
| 1 | Rural area. |
| 2 | Small town (5,000 or less). |
| 3 | City (5,000 to 50,000). |
| 4 | Residential suburb. |
| 5 | Industrial suburb. |
| 6 | Residential area of a larger city (50,000+). |
| 7 | Inner part of a larger city (50,000+). |

These two variables were taken together to represent Area of Residence.[2] They were used in regression and commonality analyses along with the set of six FB measures to show the percent of variation in ACHV that is unique and in common with these sets of variables. Since these analyses have not been presented before, R-squares for the different sets of variables will be discussed first, followed by grade-level trends for the commonality analyses.

The R-squares in figure 7.2 are presented in such a manner that one can see the percentage of variation in ACHV accounted for by the two variables used to represent Area of Residence. These percentages are represented by the shaded portions of the bar graphs, while the percentage of variation accounted for by both sets of variables, FB and Area of Residence, is represented by the combined shaded and plain portions. Since the percent of variation in ACHV accounted for by FB has been discussed elsewhere, emphasis will be given primarily to the shaded portions. These shaded portions tend to be larger for the "Other" racial-ethnic groups and for "Total (U and I)" than for whites or for "Total (A)." The zero values for Oriental-Americans are rather curious in the light of our previous discovery that there were fairly substantial mean ACHV differences between Oriental-Americans in the mid-Atlantic and Far West (p. 25). Actually, the variables used here to represent Area of Residence do not allow the full regional differences among Oriental-Americans to enter into the analysis because the mid-Atlantic and Far Western differences are incorporated into only a limited range of the regional continuum. For Oriental-Americans, therefore, these two variables interact over only a portion of their entire range, and the degree of association is consequently understated.

There are also some sex differences. The percentages are slightly greater for Mexican-American, Negro, and Oriental-American males, and for Indian and Puerto Rican females. For the other groups the values for the two sexes are more nearly equal.

The results of unitized commonality analyses for these two sets of variables, Family Background (FB) and Area of Residence (A), are given in table 7.6. To get an idea of how the results from the ninth grade in chapter 3 compare with these analyses, we should add the common portion to the unique commonality for A. For example, for Indians, 4 percent of their variation in ACHV (viz, 3 plus 1) can be associated with A. For Negroes, on the other hand, the corresponding value is 22 percent (12 plus 10). Differences of interpretation arise between the results presented here and those in chapter 3 because in the former FB was taken into consideration whereas in the lattter it was not. Some of the differences among the regional groups in chapter 3 can be more readily attributed to differences in FB, while still others are in common with FB and A. This is not a shortcoming of the analyses in chapter 3, for they were prepared primarily to indicate the magnitude of regional differences and not to explain why these differences arise. The analyses presented here are directed more to the second point.

It will be seen from table 7.6 that the unique value for A relative to that for FB is always rather small. The role of A is lowest for Oriental-Americans, Mexican-Americans, and whites, and greatest for Negroes and Puerto Ricans. The magnitude of the common portions is largest for Negroes and sixth-grade Puerto Ricans. Differences in the magnitude of the role of A for the sexes are neither pronounced nor consistent. The main exceptions are for Puerto Ricans at grades 12 and nine, and Indians at grade 12. For these latter groups the sex differences are pronounced but do not favor either sex consistently. In conclusion, then, we may say that the role of A in ACHV that is independent of FB is substantially larger for Puerto Ricans and Negroes than for the other groups. For the latter, A does not appear to be large enough to warrant being given the status of a major explanatory variable. For Puerto Ricans and Negroes, however, the reverse is true. For these groups, one may well note what it is in their environment that gives rise to these differences in ACHV, independent of FB.

### 7.1.1. The Roles of Family Background and School Factors

The remaining analyses in this section focus on the stability of the results involving the different sets of school factors. Figure 7.3 displays trends in the relationships of individual student variables with their school mean counterparts. These relationships, in the form of squared correlations, are lower for FSS at the first grade primarily because it was at this level that the teacher was asked to provide the data on her students, and was sometimes unable (or unwilling) to do so.[3] In spite of these shortcomings (not to mention dropouts at the higher grade levels and the so-called feeder school effect[4]) these relationships do remain fairly stable. Indeed, ACHV va-

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[2] The correlations between these two variables are: .14, .18, and .24, at the 6th, 9th, and 12th grades, respectively, for all groups combined. The numbers of students are given in table 7.2.

[3] As a consequence there was less FSS variability.

[4] This is a reduction in the among-school variance at the higher grade levels caused by "feeding" students of dissimilar background into the same schools.

FIGURE 7.3. - GRADE-LEVEL TRENDS IN THE PERCENT OF VARIANCE IN INDIVIDUAL STUDENT MEASURES ASSOCIATED WITH THE SCHOOLS STUDENTS ATTEND

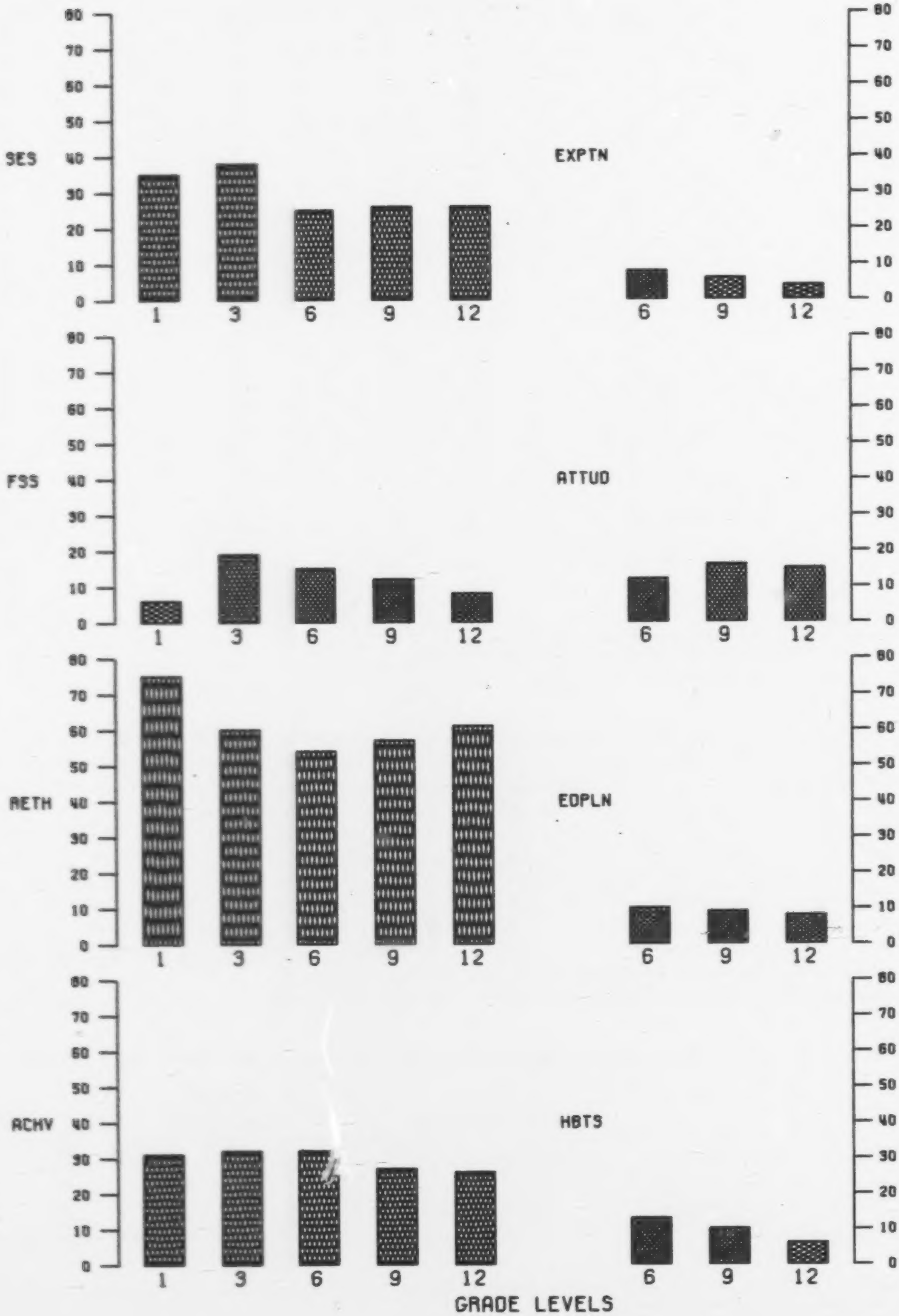

Fig. 7.3 (19a)

Table 7.6.—Commonality Analyses of Area of Residence and Family Background, by Sex and Racial-Ethnic Group Membership

| Group | Grade Level | Total |  |  | Male |  |  | Female |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  |  | A | FB |  | A | FB |  | A | FB |  |
| Indian | 12 | 7 | 93 | 0 | 3 | 94 | 3 | 19 | 81 | 0 |
|  | 9 | 3 | 96 | 1 | 4 | 96 | 0 | 3 | 86 | 11 |
|  | 6 | 5 | 92 | 3 | 3 | 94 | 3 | 6 | 89 | 5 |
| Mexican | 12 | 3 | 97 | 0 | 5 | 95 | 0 | 5 | 95 | 0 |
|  | 9 | 2 | 96 | 2 | 3 | 96 | 2 | 1 | 98 | 1 |
|  | 6 | 3 | 93 | 4 | 3 | 92 | 5 | 4 | 93 | 3 |
| Puerto Rican | 12 | 5 | 94 | 1 | 6 | 94 | 0 | 13 | 83 | 4 |
|  | 9 | 15 | 85 | 0 | 20 | 80 | 0 | 11 | 89 | 0 |
|  | 6 | 16 | 69 | 15 | 14 | 72 | 14 | 17 | 68 | 14 |
| Negro | 12 | 16 | 73 | 11 | 18 | 69 | 13 | 14 | 77 | 9 |
|  | 9 | 12 | 78 | 10 | 13 | 76 | 11 | 12 | 81 | 7 |
|  | 6 | 10 | 82 | 8 | 9 | 84 | 7 | 11 | 80 | 9 |
| Oriental | 12 | 0 | 99 | 1 | 0 | 96 | 4 | 2 | 98 | 0 |
|  | 9 | 0 | 99 | 1 | 1 | 96 | 3 | 0 | 99 | 1 |
|  | 6 | 1 | 88 | 11 | 3 | 82 | 15 | 1 | 95 | 4 |
| White | 12 | 3 | 95 | 2 | 3 | 94 | 3 | 3 | 96 | 1 |
|  | 9 | 2 | 95 | 3 | 2 | 94 | 4 | 3 | 96 | 1 |
|  | 6 | 2 | 95 | 3 | 2 | 95 | 3 | 2 | 95 | 3 |
| Total (U)[a] | 12 | 6 | 88 | 5 | 6 | 88 | 6 | 7 | 89 | 5 |
|  | 9 | 4 | 91 | 5 | 4 | 90 | 6 | 4 | 91 | 5 |
|  | 6 | 4 | 89 | 7 | 4 | 89 | 7 | 4 | 89 | 7 |
| Total (I)[b] | 12 | 3 | 90 | 7 | 3 | 90 | 7 | 2 | 90 | 8 |
|  | 9 | 2 | 92 | 6 | 2 | 91 | 7 | 2 | 92 | 6 |
|  | 6 | 2 | 91 | 8 | c | c | c | c | c | c |
| Total (A)[d] | 12 | 4 | 93 | 3 | 5 | 92 | 3 | 4 | 95 | 1 |
|  | 9 | 2 | 94 | 3 | 3 | 93 | 4 | 3 | 95 | 2 |
|  | 6 | 3 | 92 | 5 | c | c | c | c | c | c |

[a] Total when Racial-Ethnic Group Membership is not included in the analysis.

[b] Total when Racial-Ethnic Group Membership is included as a Home Background variable.

[c] Not available.

[d] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

ries only from a high of 32 percent at the third and sixth grades to a low of 26 percent at the 12th grade. An adequate set of PRCS measures was not available at the lower grades. However, at those grade levels for which adequate measures were available some stability can be observed. Thus EXPTN, EDPLN, and HBTS showed a slight decline at the higher grades, while ATTUD increased slightly. Overall, although some changes did occur, there was a substantial degree of stability in these relationships for the various grade levels.

The next series of analyses deals with grade-level stability in the relative roles of HB and PRCS with ACHV for the different analytic *types* and *levels* (p. 36). For the U type, it will be recalled, RETH is not included in the analyses; for the I type, RETH is included as an HB variable; and for the A type, ACHV is adjusted for RETH before the analyses are run. The different levels of analysis are denoted by T (for total differences among students), A (for differences among schools), and W (for differences among students within schools). For each of the three levels, types, and grade levels, the ratio obtained by dividing the unique role of PRCS by that of HB is given in table 7.7

For all three types of analysis (U, I, and A) the ratios

Table 7.7.—Grade-Level Trends in the Roles of Process and Home Background Measures for Total, Among, and Within Analyses

| Level of Analysis | PRCS/HB |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Grade Level |  |  | Grade Level |  |  | Grade Level |  |  |
|  | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Total | .90 | 1.50 | 2.20 | .40 | .79 | 1.0 | 1.80 | 4.30 | 8.0 |
| Among | .03 | .24 | .33 | .03 | .11 | .06 | .18 | .76 | .09 |
| Within | 3.36 | 6.70 | 21.70 | 2.00 | 3.83 | 6.90 | 3.92 | 10.40 | 34.00 |
| Type of Analysis | U[a] |  |  | I[b] |  |  | A[c] |  |  |

[a] Racial-Ethnic Group Membership not included in the analysis.

[b] Racial-Ethnic Group Membership included as a Home Background variable.

[c] Role of Racial-Ethnic Group Membership in Achievement has been partialed out.

show that at the T and W levels the role of PRCS relative to that of HB increases for the higher grades. For the T analyses, however, the role of PRCS is exceeded by that of HB at the sixth and ninth grades for the I type and at the sixth grade for the U type. At the A level the role of HB always exceeds that of PRCS. For the U type this becomes increasingly so at the higher grade levels. For the I type there is very little change, but what change there is indicates a slight decrease in the role of PRCS at the ninth grade with an increase again at the 12th. For the A type and level there is also an increase in the role of PRCS at the ninth grade. But it decreases again at the 12th. What does stand out above all else, however, is the fact that for each grade level the relative roles of HB and PRCS at the A level are very different from their roles at the T and W levels. At the W level, the role of PRCS always exceeds that of HB for all types of analysis. At the T level, PRCS exceeds HB for the A type all of the time, for the U type at grades 9 and 12, and for the I type only at grade 12. At the A level, however, the role of HB always exceeds that of PRCS—usually to a substantial extent. Hence, there tends to be an inverse relationship between the magnitude of the explanatory role played by these sets of factors at the individual and at the school level. In other words, factors that play a large role in explaining ACHV at one level tend to play a small role at the other level.

In the next set of analyses we compared the relative roles of the sets of FB and SCH factors in ACHV, by grade level and geographic locale. The 22 school variables, as described in chapter 6, were used here to represent different aspects of the school. The three types of analyses (U, I, and A) that were used above were also conducted here in order to determine the role played by RETH at the different grade levels. The ratios obtained by dividing the unique role for FB by that of SCH are given in table 7.8. It will be seen that these ratios tend to be larger at the two higher grade levels.[5] In the North the ratios tend to increase with the higher grade levels, whereas in the South they increase from the sixth to ninth grades and decrease slightly at the 12th grade. In fact, in the metropolitan South at the 12th grade the unique role of SCH slightly exceeds that of FB (the ratio is slightly less than one for the U analyses[6]). Even in the metropolitan South, the ratio is larger for the I and A analyses. This shows that the role of FB substantially exceeds that of SCH.

In summary then, we can conclude that the role of FB exceeds that of SCH, but that the extent to which it does so depends on the type of analysis, geographic locale, and grade level. The magnitudes of the ratios are uniformly greater in the North than in the South for each type of analysis, and are uniformly greater for the I and A than for the U type. Had we chosen the sixth grade as the primary group for analysis we would have attributed somewhat more to the role of SCH, but would still have concluded that the role of FB substantially exceeded it.

Table 7.8.—Grade-Level Trends in the Roles of Family Background and School Factors, by Geographic Location

| | Non Metropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Type | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| | | | | FB/SCH: North | | | | | |
| U | 2.2 | 4.9 | 6.7 | 1.5 | 3.1 | 4.3 | 1.8 | 3.6 | 4.7 |
| I | 3.5 | 8.8 | 8.0 | 3.5 | 6.8 | 11.2 | 3.5 | 7.2 | 10.1 |
| A | 2.8 | 7.6 | 7.4 | 3.0 | 5.3 | 9.1 | 2.8 | 5.9 | 8.1 |
| | | | | FB/SCH: South | | | | | |
| U | 1.0 | 1.6 | 1.1 | 1.0 | 1.6 | .9 | 1.0 | 1.6 | .9 |
| I | 2.5 | 4.1 | 3.0 | 2.8 | 4.3 | 2.7 | 2.5 | 4.0 | 2.8 |
| A | 1.9 | 3.4 | 2.6 | 2.3 | 3.7 | 2.7 | 2.1 | 3.5 | 2.5 |
| | | | | FB/SCH: Total | | | | | |
| U | 1.2 | 2.2 | 1.6 | 1.2 | 2.4 | 2.2 | 1.2 | 2.2 | 1.9 |
| I | 2.5 | 4.4 | 3.4 | 3.1 | 5.3 | 6.0 | 2.8 | 4.8 | 4.6 |
| A | 1.9 | 3.8 | 3.2 | 2.4 | 4.4 | 5.1 | 2.2 | 4.1 | 4.0 |

NOTE.—"U" denotes that Racial-Ethnic Group Membership is not included in the analysis; "I" that Racial-Ethnic Group Membership is included as a Home Background Variable; and "A" that the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

As a corollary to the previous analyses a check was made on the grade level stability of the ratios for each racial-ethnic group, by sex. As described in chapter 6, because of the small number of schools for some groups, 16 variables were used to represent different aspects of the school. Table 7.9 shows the ratios of the unique value for FB divided by that for SCH. It is clear that for almost all of the groups, the magnitude of the ratios tends to oscillate, being greatest at the ninth grade. The main exceptions are for Oriental-Americans and for female whites, for whom the ratios show an increasing value at the higher grade levels. The ratios tend to be larger for males than for females except for Negroes, for whom the reverse is true. Thus, SCH has a greater role relative to FB for females than for males, except for Negroes. Had we chosen the sixth or 12th grade as our primary group for analysis we would still have concluded that the role of FB exceeds that of SCH to a substantial degree, although the extent to which it does so would have been slightly less than for the ninth grade.

## 7.2. GRADE-LEVEL TRENDS IN THE ROLES OF SCHOOL FACTORS

The remaining analyses of grade-level trends focus on the relative roles played by different sets of school variables after adjustments have been made for FB. First, we shall compare the role played by the set of student body variables called School Outcomes (SO) with that played by the set of three variables called Student Body Social Background (SBSB).[7] For each group, the ratios of the unique role of SO divided by that of SBSB, shown in table 7.10, are always substantially greater than one. The extent to which this is so tends to vary by

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[5] Some of the differences between the 6th grade and the grades above it are due to the differing composition of the student indices.

[6] Examination of the values for the unique and common portion showed that at the 12th grade the common portions were much larger and the unique portions smaller in the South than in the North.

[7] See chapter 6 for a description of both these sets.

Table 7.9.—Grade-Level Trends in the Roles of Family Background and School Factors, by Sex and Racial-Ethnic Group Membership

| | FB/SCH | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 1.1 | 1.7 | 1.1 | 1.3 | 1.7 | 1.6 | .8 | 1.4 | .5 |
| Mexican | 1.2 | 1.6 | 1.4 | 1.4 | 1.6 | 1.4 | .9 | 1.6 | 1.1 |
| Puerto Rican | 1.0 | 1.7 | .9 | 1.3 | 1.4 | 1.2 | .7 | 1.9 | .6 |
| Negro | 1.3 | 1.9 | 1.4 | 1.4 | 1.7 | 1.3 | 1.2 | 1.1 | 1.5 |
| Oriental | 2.7 | 5.6 | 8.4 | 1.5 | 4.1 | 10.1 | 4.9 | 3.9 | 4.5 |
| White | 3.7 | 7.5 | 7.0 | 3.7 | 7.4 | 6.8 | 3.5 | 7.6 | 7.9 |
| Total (U)[a] | 1.4 | 2.3 | 2.0 | 1.6 | 2.7 | 2.2 | 1.2 | 2.2 | 1.9 |
| Total (I)[a] | 2.8 | 5.3 | 4.7 | [b] | 5.4 | 4.6 | [b] | 5.9 | 5.2 |
| Total (A)[a] | 2.2 | 5.1 | 4.2 | [b] | 5.0 | 4.1 | [b] | 4.8 | 4.4 |

[a] "U" denotes that Racial-Ethnic Group Membership is not included in the analysis; "I" that Racial-Ethnic Group Membership is included as a Home Background Variable; and "A" that the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

[b] Not available.

Table 7.10.—Grade-Level Trends in the Roles of School Outcomes and Student Body Social Background, by Sex and Racial-Ethnic Group Membership

| | SO/SBSB | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 6.4 | 9.8 | 3.5 | 6.3 | 5.3 | 2.5 | 6.4 | 14.3 | 1.1 |
| Mexican | 6.4 | 11.0 | 4.3 | 5.0 | 5.6 | 7.3 | 9.5 | 33.0 | 1.3 |
| Puerto Rican | 4.0 | 6.0 | 8.0 | 3.7 | 5.7 | 7.3 | 6.7 | 5.0 | 6.8 |
| Negro | 3.6 | 3.2 | 4.3 | 3.1 | 3.7 | 4.6 | 4.6 | 2.7 | 3.9 |
| Oriental | 3.8 | 6.1 | 6.3 | 4.4 | 4.3 | 8.1 | 3.2 | 3.1 | 3.9 |
| White | 10.7 | 10.4 | 9.4 | 10.9 | 7.2 | 8.6 | 12.2 | 15.8 | 8.1 |
| Total | 33.0 | 36.0 | 28.0 | 18.0 | 14.0 | 31.0 | 30.0 | 30.0 | 25.0 |
| Total (A)[a] | 8.1 | 7.3 | 7.8 | [b] | 5.5 | 7.0 | [b] | 9.9 | 7.4 |

[a] Role of Racial-Ethnic Group Membership in Achievement has been partialed out

[b] Not available.

grade level, racial-ethnic group, and sex. Thus the ratios for male Mexican-Americans, Puerto Ricans, and Negroes tend to increase at the higher grade levels, while the corresponding figures for the females of these same groups tend to oscillate. In contrast, the ratios for Oriental-Americans of both sexes tend to increase, while those for whites of both sexes tend to oscillate. The ratios for all groups combined show an oscillating trend for males and a decreasing trend for females. However, when adjustments are first made for Racial-Ethnic Group Membership it appears that the ratios for males descend while those for females may oscillate. Actually, we can only guess what this trend might be since the adjusted values are missing for males and females at the sixth grade. No matter what grade level we had chosen for analysis, however, we would have concluded that the role of SO exceeds that of SBSB. But sex differences in the relative roles would still have depended on the group and grade level.

We turn now to examine the grade-level stability in the relative roles of two subsets of the SO variables. One of these subsets contains a single variable: the mean ACHV of students in the school and grade attended by each individual student. This subset is called SACHV, for Student Body Achievement. The other subset contains the four student body attitudinal and motivational variables and is therefore called SMTV, for Student Body Motivation.[5] Inspection of the ratios of the unique value of SACHV divided by that of SMTV in table 7.11 reveals that, for almost all groups and grade levels, the role of SACHV exceeds that of SMTV, usually to a substantial extent. The main exception is for Oriental-Americans, for whom the role of SMTV exceeds that of SACHV at grades nine and 12 but not at grade six. The ratios tend to oscillate for most groups by grade level. For Mexican-Americans and Negroes, however, they descend in magnitude from the lower to higher grade levels. The ratios tend to be larger for female than male Indians, Mexican-Americans, Negroes, and "Totals." For other groups differentiated by sex there is no clear trend. One result, however, stands out clearly: the role of SACHV substantially exceeds that of SMTV, except for Oriental-Americans at grades nine and 12. If our analysis had focused exclusively on the sixth grade, there would not have been even this exception.

Finally, we undertook two series of analyses in which we used two sets of teacher attributes, T(5) and T(6).

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[5] See chapter 6 for a description of both these subsets.

**Table 7.11.—Grade-Level Trends in the Roles of Student Body Achievement and Motivation, by Sex and Racial-Ethnic Group Membership**

| | SACHV/SMTV | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 11.1 | 2.3 | 5.2 | 7.3 | 1.7 | 3.8 | 12.2 | 2.4 | 9.3 |
| Mexican | 17.2 | 5.0 | 6.2 | 14.2 | 4.8 | 3.7 | 16.5 | 4.9 | 3.9 |
| Puerto Rican | 9.6 | 1.3 | 6.6 | 8.1 | 1.2 | 7.2 | .9 | 1.6 | 3.0 |
| Negro | 11.4 | 6.8 | 4.5 | 11.3 | 5.8 | 3.6 | 13.3 | 7.1 | 5.7 |
| Oriental | 3.9 | .4 | .8 | 3.3 | .3 | .6 | 2.5 | .6 | .8 |
| White | 6.7 | 3.0 | 3.9 | 6.1 | 3.3 | 3.9 | 6.7 | 3.2 | 3.6 |
| Total | 11.0 | 5.1 | 5.9 | 9.8 | 4.8 | 6.1 | 12.5 | 4.9 | 6.3 |
| Total (A) [b] | 7.2 | 3.2 | 4.8 | [b] | 3.3 | 4.6 | [b] | 3.1 | 5.1 |

[a] Role of Racial-Ethnic Group Membership in Achievement has been partialed out.

[b] Not available.

The variables that make up each set are described in detail in chapter 6 (p. 57). Ratios of the unique role for T(5) divided by that for T(6) are shown in table 7.12. These ratios show that, for almost all grade levels, the role of T(5) exceeds that of T(6), usually to an appreciable extent. The main exceptions are for ninth-grade Puerto Ricans, whites, and male Oriental-Americans. For most of the groups an oscillatory trend can be discerned over the grade levels. Exceptions to this occur for Indian males, Puerto Rican females, and Oriental-American males, for whom there is a decreasing trend, and Mexican-American males and Oriental-American females, for whom there is an increasing trend. The largest ratios of T(5) to T(6) occur when all groups are combined. We argued in chapter 6 that the greatest differences among the teachers that are related to the ACHV levels of their students exist between teachers of white students as opposed to teachers of other students, and that consequently the ratios for the T and T(A) analyses were of the greatest interest to us. The magnitude of these ratios indicates the tremendous extent to which the role of T(5) exceeds that of T(6) even after adjustments have been made for RETH. If we had focused exclusively on the sixth or 12th grades we would have concluded that T(5) played an even greater role.

The last grade-level comparisons made were for the relative roles of SO and T(5). The ratios for these analyses are shown in table 7.13. It will be seen that for every group save one (12th-grade Mexican-American females) the role of SO exceeds that of T(5). In the case of whites and all groups combined, the extent to which it does so is especially pronounced even after adjustments have been made for RETH. Most of the groups show an oscillating trend by grade level, except for Indians and Mexican-American females, who show a decreasing trend, and for Puerto Rican females, who show an increasing trend with the higher grade levels. The ratios tend to be larger for male than for female Indians, Mexican-Americans, and "Totals," and for female rather than male Puerto Ricans and Negroes. Variations by sex for the other groups are not consistent. Regardless of grade level, we would have concluded that the role of SO substantially exceeded that of T(5).

## 7.3. SUMMARY

In this chapter we have compared the stability of results obtained for ninth-grade students and their schools with those for other grade levels. Three different kinds of grade-level comparisons were made: simple correlations; percent of ACHV associated with different sets of variables and their commonalities; and the results of commonality analyses presented as a ratio of the unique value for one set divided by that for another set. The grade levels used were almost always six, nine, and 12

**Table 7.12.—Grade-Level Trends in the Roles of a Set of Five anda Set of Six Teacher Attributes, by Sex and Racial-Ethnic Group Membership**

| | T(5)/T(6) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 5.0 | 5.1 | 4.0 | 4.1 | 2.0 | 1.7 | 4.8 | 8.8 | 1.5 |
| Mexican | 9.5 | 14.4 | 3.4 | 6.9 | 6.9 | 18.3 | 6.6 | 20.8 | 1.3 |
| Puerto Rican | 5.4 | .8 | 1.9 | 6.5 | .4 | 1.9 | 4.7 | 1.8 | 1.1 |
| Negro | 6.8 | 1.2 | 3.2 | 4.0 | 1.2 | 3.1 | 9.6 | 1.1 | 2.9 |
| Oriental | 1.6 | 1.4 | 1.4 | 1.5 | .4 | .4 | 1.3 | 1.4 | 5.2 |
| White | 6.1 | .6 | 4.3 | 7.3 | .6 | 5.7 | 4.9 | .7 | 2.7 |
| Total | 39.5 | 21.0 | 77.0 | 39.5 | 16.7 | 77.0 | 40.0 | 28.3 | 38.0 |
| Total (A) [a] | 12.8 | 3.6 | 12.2 | [b] | 4.4 | 14.8 | [b] | 3.8 | 8.7 |

[a] Role of Racial-Ethnic Group Membership in Achievement has been partialed out.

[b] Not available.

**Table 7.13.—Grade-Level Trends in the Roles of School Outcomes and a Set of Five Teacher Attributes, by Sex and Racial-Ethnic Group Membership**

| | SO/T(5) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | |
| | Grade Level | | | Grade Level | | | Grade Level | | |
| Group | 6 | 9 | 12 | 6 | 9 | 12 | 6 | 9 | 12 |
| Indian | 6.3 | 6.1 | 10.8 | 7.2 | 5.3 | 3.6 | 5.7 | 5.0 | 1.8 |
| Mexican | 7.5 | 8.6 | 5.0 | 7.8 | 16.3 | 9.0 | 7.5 | 4.3 | .8 |
| Puerto Rican | 3.9 | 26.0 | 4.6 | 3.1 | 7.2 | 1.9 | 5.5 | 7.9 | 23.0 |
| Negro | 5.2 | 6.1 | 5.9 | 3.9 | 6.4 | 5.3 | 6.4 | 5.1 | 5.8 |
| Oriental | 2.0 | 3.0 | 2.3 | 2.0 | 1.9 | 2.8 | 2.2 | 2.5 | 1.1 |
| White | 76.0 | 96.0 | 29.0 | 38.5 | 48.0 | 43.0 | 74.0 | 95.0 | 29.3 |
| Total | 37.0 | 45.0 | 39.0 | 40.0 | 50.0 | 41.0 | 34.0 | 41.0 | 37.0 |
| Total (A)[a] | 8.1 | 27.7 | 14.2 | [b] | 21.0 | 11.8 | [b] | 41.0 | 14.2 |

[a] Role of Racial-Ethnic Group Membership in Achievement has been partialed out.

[b] Not available.

(grades one and three were seldom used because adequate PRCS measures were not available at those levels). The increasing proportion of white and Oriental-American students at the higher grade levels indicated that we were dealing with distinctly different populations. More specifically, we found that students who remained in school through the higher grade levels scored higher on variables indicating school-going propensities and on all variables correlated with these propensities. We also found that variations from the sixth to the ninth grade could be due, in part, to the slightly less comprehensive nature of the sixth-grade student indices.

Correlations of each index or variable with ACHV showed that Socio-Economic Status (SES) had some of the largest correlations with ACHV, but the magnitude of the correlation in each case depended upon the group and grade level under consideration; Family Structure (FSS) decreased in magnitude at the higher grades for all groups, partly (it may be) through loss of students from the less intact families; Expectations for Excellence (EXPTN) showed sufficient variation by racial-ethnic group and grade level to suggest that it played a role independent of changes in the composition of the student body; Attitude Toward Life (ATTUD) showed higher correlations at the ninth than at the sixth and 12th grades, except for Oriental-Americans; Educational Plans (EDPLN), which also had some of the largest correlations, showed an increasing value for Negroes and whites at the higher grade levels, but a decreasing value for the other groups; and Study Habits (HBTS) tended to show lower values at the higher grade levels for all groups—an effect that may be due to the loss of the less studious students at those levels. For all groups the largest correlations tended to occur for SES and EDPLN. The other indices varied by racial-ethnic group and grade level.

Comparison of the ratios obtained by dividing the unique role of SES by that for FSS showed that, for groups other than Oriental-Americans, there was an increasing tendency for the role of SES to exceed that of FSS at the higher grade levels. For Oriental-Americans the opposite trend was observed, subject only to some variations by sex. The smaller magnitude of the ratios observed for males at all grade levels indicated that for males FSS played a greater relative role. If the sixth grade had been chosen as the primary group for analysis rather than the ninth grade, we would have attributed a greater role to FSS. On the other hand, if the 12th grade had been chosen rather than the ninth grade, we would have attributed a lesser role to FSS.

The set of ratios obtained by dividing the role of PRCS by that of HB showed that there was a tendency for PRCS to play an increasingly greater role at the higher grade levels. Exceptions were noted for Indians and Negroes, and the trend varied somewhat by sex. A larger ratio for males than for females (except Oriental-Americans and Puerto Ricans), for all grade levels, indicated that PRCS played a greater role for males. For most groups and grade levels the role of PRCS equaled or exceeded that of HB. The major and most important exception was when Racial-Ethnic Group Membership (RETH) was included as an HB variable. In this latter case HB exceeded PRCS for females, whereas for males their relative roles were more nearly equal.

The next comparisons involved the roles of different PRCS measures after adjustments in ACHV had been made for HB. Ratios were formed by dividing the role for the set of three MTVTN measures by that for EDPLN. These ratios varied considerably by the grade level. At the sixth grade EDPLN played a greater role than MTVTN for all groups. At the ninth grade, however, the role of MTVTN began to increase for all groups. This increase was usually sustained, and in some cases increased further, at the 12th grade. For most groups there was a tendency for the role of MTVTN to exceed that of EDPLN to a greater extent for females than for males. If we had chosen to concentrate on the sixth grade we would have attributed a somewhat greater role to EDPLN. However, this might well have been misleading, since at the sixth grade a student's educational plans are still developing.

We next attempted to summarize differences in Achievement by Area of Residence that were independent of Family Background. Area of Residence (A) was defined by two variables pertaining to the student's residence: location with respect to degree of urbanization, and location with respect to geographic region. Commonality analyses showed that the role played by A was usually small relative to that played by FB. The greatest role played by A that was independent of FB for all grade levels was for Negroes and Puerto Ricans; for the other groups A played a much smaller role. Of course, a more refined set of variables defining one's geographic locale may have yielded greater differences for some of the other racial-ethnic groups, such as Oriental-Americans. For Negroes and Puerto Ricans, however, these variables do indicate that there may be something about the conditions under which they reside that give rise to differences among them in their ACHV, independently of their FB.

The remaining analyses focused on the grade level stability in the relative roles of different sets of school variables after adjustments had been made in ACHV for FB. The first of these analyses compared the magnitude of the role played by the set of student body variables called School Outcomes (SO) with that played by the set of variables called Student Body Social Background (SBSB). These analyses showed that the role of SO substantially exceeded that of SBSB at all grade levels. However, variations by sex depended on group and grade level. The next of these analyses focused on the relative roles of two subsets of the SO variables: the mean ACHV of students in a particular school and grade level, called SACHV, and four other student variables, called SMTV for student body motivation. These analyses showed that the role of SACHV substantially exceeded that of SMTV for most groups and grade levels. The main exception was for Oriental-Americans, for whom SMTV exceeded SACHV at the ninth and 12th grades. Male Indians, Mexicans, Negroes, and all groups combined tended to show a greater sensitivity to SACHV as opposed to SMTV than did the females of each group. Had we chosen the 12th grade as our group for analysis, we would have arrived at much the same conclusions as for the ninth grade. Had we chosen the sixth grade, we would have arrived at the same conclusion as for the ninth grade but these conclusions would also have been applicable to Oriental-Americans.

Another of these analyses compared the relative roles of a set of five and a set of six teacher attributes, called T(5) and T(6). It was found that, for almost all groups and grade levels, the magnitude of the role played by the T(5) set exceeded that of the T(6) set, often to a substantial extent. This effect was particularly pronounced when teachers of white students were compared with teachers of others. This comparison, we reasoned, was the one of greatest interest to anyone seeking to understand how the allocation of teachers to schools may affect students. Had we chosen the sixth or 12th grade as our primary group for analysis, we would have concluded that T(5) played an even greater role relative to T(6) than was the case at the ninth grade.

Finally, we compared the relative roles of the SO and T(5) sets. We found that for almost every group and grade level the role of SO exceeded that of T(5), often to a substantial extent. The extent to which it did so was particularly pronounced for whites, and for all groups combined, even after adjustments were made for RETH. The magnitude of the ratios indicated that SO played a greater relative role for female than for male Indians and Mexican-Americans, and for male than for female Puerto Ricans and Negroes. Regardless of the grade level chosen, however, we would have concluded that the role of SO substantially exceeded that of T(5).

In summary, this chapter investigated the stability of results obtained from ninth-grade students and their schools. Comparison of results for the different grade levels showed that very similar kinds of conclusions would have been reached if the other grade levels had been used instead of the ninth grade. However, exceptions would have to be made for the relative roles of FSS and EDPLN. Relative to SES, FSS played a slightly greater role at the sixth and a smaller role at the 12th grade than at the ninth. Also, relative to MTVTN, EDPLN played a greater role at the sixth grade than at the higher grades. In the former case, the conclusions would have changed very little. In the latter case, however, somewhat different conclusions would have been drawn. But it was argued that the sixth grade was not the best grade on which to make conclusions about students' educational plans, for they were still developing.

## Chapter 8

## SPECIAL TOPICS

In this chapter we shall inquire into a number of special topics. Some of them throw light on analyses in earlier chapters; others are of interest in their own right. The first topic to be explored is the role that speaking English in the home plays in the development of achievement. Second, we shall study the role played by each of the Home Background (HB) factors and each of the Family Process (PRCS) measures as a member of its own set, as well as its relationships across sets. In earlier analyses, because of the large number of comparisons to be made, this was not practical. However, over all students these comparisons become not only practical but extremely significant, since they give us some idea of the reciprocal relationships among the different variables. The third topic to be studied is the magnitude of the role played by Racial-Ethnic Group Membership (RETH) in Achievement, as different social background conditions are taken into account. The fourth topic is the educational status of girls as compared with boys, and the factors that may be operative in the development of their educational plans. Finally, we shall examine regional variations in the role of school factors for each separate racial-ethnic group, by sex.

### 8.1. ACHIEVEMENT AND LANGUAGE SPOKEN AT HOME

The principal medium of communication in American schools is the English language. But, as is well known, most teachers seek to uphold standards of "correct" English, and discourage the use of local or ethnic idiom. We therefore hypothesized that if a student spoke a language other than English at home this very fact might serve as an impediment to his school performance. To test this hypothesis, we used the data on sixth-grade students.[1] In addition to Family Background (FB) and Achievement (ACHV) an item pertaining to the use of English as opposed to some other language was included. For this item, students who said they spoke only English at home were scored high while those who indicated that they spoke some language other than English were scored low.[2]

The correlations of this "language in the home" variable turned out to be small. Moreover, they were very similar in magnitude for males and females within each racial-ethnic group. Consequently, only results for the group totals are presented in table 8.1. In addition, because these correlations were so small, a modified "stepwise" procedure was adopted in order to show the percent of variation in ACHV associated with Language in the Home after different FB variables had been brought into the analysis. Table 8.1 presents the results of these analyses for each of the six racial-ethnic groups, and for all groups combined when RETH is not included in the analysis, when RETH is included as a background variable, and when ACHV has first been adjusted for RETH.

Table 8.1.—Percent of Variation in Achievement Accounted for by Family Background Measures and Language in the Home, by Racial-Ethnic Group Membership [a]

| | N | SES | HB | FB |
|---|---|---|---|---|
| I | 2 | 1 | 0 | 0 |
| M | 1 | 0 | 0 | 0 |
| P | 1 | 0 | 0 | 0 |
| N | 2 | 1 | 1 | 0 |
| O | 1 | 0 | 0 | 0 |
| W | 2 | 1 | 1 | 0 |
| T (U)[b] | 3 | 1 | 1 | 0 |
| T (I)[c] | 4 | 0 | 0 | 0 |
| T (A)[d] | 2 | 0 | 0 | 0 |

[a] "N" denotes that no other variables were entered; "SES" that Socio-Economic Status was entered first; "HB" that Home Background was entered first; and "FB" that Family Background was entered first.

[b] Total when Racial-Ethnic Group Membership is not included in the analysis.

[c] Total when Racial-Ethnic Group Membership is included as a Home Background variable.

[d] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

**Legend**

**I** — Indian
**M** — Mexican
**P** — Puerto Rican
**N** — Negro
**O** — Oriental
**W** — White
**T** — Total

The figures in table 8.1 represent the percent of total variation in ACHV associated with Language in the Home (LIH) for the following conditions:

N: No prior conditions or variables have been taken into account, that is, entered into the regression. This is the squared correlation of LIH with ACHV.

SES: The index of Socio-Economic Status is entered into the regression first, and then LIH is entered and the increment for it recorded.[3]

HB: SES and FSS are entered into the regression first, and then the increment for LIH is recorded.

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[1] See table 7.2 for the number of students from each racial-ethnic

[2] The exact wording and scoring of the item was, "Does anyone in your home speak a language other than English most of the time? (German, Italian, Spanish, etc.) (A) Yes, (B) No."

[3] This is merely another way of expressing the unique commonality coefficient for LIH.

Table 8.2.—Commonality Analyses of Three Home Background Measures With Selected Motivation and Achievement Measures, for 9th-Grade Students (N=133,136)

| | Expectations for Excellence | | | Attitude Toward Life | | | Educational Plans and Desires | | | Study Habits | | | Achievement | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SES 1 | FSS 2 | RETH 3 | SES 1 | FSS 2 | RETH 3 | SES 1 | FSS 2 | RETH 3 | SES 1 | FSS 2 | RETH 3 | SES 1 | FSS 2 | RETH 3 |
| U(Xi) | 32 | 21 | 1 | 22 | 11 | 8 | 63 | 3 | 2 | 19 | 33 | 0 | 31 | 0 | 19 |
| C(X1X2) | 32 | 32 | . . | 19 | 19 | . | 24 | 24 | . | 30 | 30 | | 8 | 8 | |
| C(X1X3) | 1 | . . | 1 | 12 | . . | 12 | (−)1 | . . | (−)1 | 2 | . | 2 | 21 | . | 21 |
| C(X2X3) | . . | 0 | 0 | | 5 | 5 | . . | (−)1 | (−)1 | . . | 1 | 1 | | 2 | 2 |
| C(X1X2X3) | 14 | 14 | 14 | 22 | 22 | 22 | 9 | 9 | 9 | 16 | 16 | 16 | 20 | 20 | 20 |
| Sum % | 79 | 67 | 16 | 75 | 57 | 47 | 85 | 35 | 9 | 67 | 80 | 19 | 80 | 30 | 62 |
| R-SQ (T) | . . | 20 | . . | | 19 | . . | . . | 30 | . . | | 30 | . . | . . | 36 | |

FB: Same as above, only this time the six FB variables are entered first, and then the LIH increment is recorded.

It is clear from table 8.1 that the small relationship that does exist between LIH and ACHV can be completely explained by SES for Mexican-Americans, Puerto Ricans, Oriental-Americans, and the totals with "I" and "A" adjustments. For the remaining groups, a similar role is played by HB. We can conclude either that LIH is a very poor measure of what it purports to measure, or that the effect of LIH on ACHV is very slight. If we favor this latter alternative, we might ask if the effect is slight because the incidence of speaking some language other than English at home is infrequent. Actually, 17 percent of all sixth-grade students indicated that some language other than English was spoken at home. Their mean ACHV score was 47.4, while the mean of those students who indicated that only English was spoken at home was 50.8 (where the mean for both groups combined was 50 and the standard deviation 10). This difference of 3.4 points (or .34 of a standard deviation) translates into a squared correlational value of about 3 percent, as indicated by the T(U) analyses in table 8.1 (see the entry under N). Hence the incidence of languages other than English is great enough to allow for the determination of an appreciable relationship if one were present. It appears, then, that a large relationship is *not* present, and that the relationship that does exist can be explained largely by differences among students in Socio-Economic Status.

## 8.2. ACHIEVEMENT, HOME BACKGROUND, AND PROCESS

Because of the large number of groups dealt with in earlier chapters it was impractical to consider the multiple relationships, both within and across sets, of each of the Home Background (HB) variables and Process (PRCS) measures. Over all students, however, the number of analyses is small enough to enable these comparisons to be made. In a dynamic framework, that is, over a time sequence, we can think of the HB variables as having a more constant influence on the students, while the ACHV and PRCS measures can be thought of as influencing one another. For example, a student's performance in school (ACHV) could influence his parents' expectations for that performance (EXPTN) as well as his educational plans (EDPLN), study habits (HBTS), and even his outlook on life (ATTUD). By a similar line of reasoning we could argue that his outlook on life influences his performance, which in turn influences each of the other variables just named. Indeed, if we were to express these relationships formally as a set of mutual influences or causal linkages, we could doubtless think of reasons why there might be a linkage between each one of these variables.[4] For instance, we might set up a matrix, as follows:

| | | | | TO | | |
|---|---|---|---|---|---|---|
| | | 1. | 2. | 3. | 4. | 5. |
| | 1. EXPTN | – | 1 | 1 | 1 | 1 |
| | 2. ATTUD | | – | 1 | 1 | 1 |
| FROM | 3. EDPLN | | | – | 1 | 1 |
| | 4. HBTS | | | | – | 1 |
| | 5. ACHV | | | | | – |

In this matrix only cells above the diagonal are filled out, and the presence of 1 indicates a possible causal linkage. We could expand the matrix to include linkages of each of the HB variables with these variables as well as with one another. However, some of these latter linkages would be difficult to specify. For example, we observe a correlation between Socio-Economic Status (SES) and Family Structure and Stability (FSS). However, family disruption (viz, father absence) is not necessarily a result of low SES; similarly, the variable called Racial-Ethnic Group Membership (RETH) is only partly a cause of low SES; and so on. In order to learn more about the possible mutual relationships of these variables we shall have to look at them in a variety of ways.

First, we attempt to shed light on the linkages between the structural aspects of the family and its more behavioral aspects. The question addressed is: What are the relative roles played by the three HB measures with ACHV and each of the PRCS measures? The three HB measures in question are SES, FSS, and RETH. These analyses, given in table 8.2, are for the 133,136 ninth-grade students. Here, as elsewhere in this section, we present the results of unitized commonality analyses for three or more sets of variables.[5] As with two sets of variables, the unitizing operation is performed by dividing each of the commonality coefficients by the squared multiple correlation for the total number of variables, here designated R-SQ(T). The percentages in the tables then represent a partitioning of the variation in the dependent variable "explained" by these variables. As a further aid to understanding the role played by each variable, a row labeled "Sum %" is given in each table. This row contains the sum of the common and unique percentages in each column, and is therefore the percentage accounted for by that variable. For example, in table 8.2, under Expectations for Excellence, 79 percent of the explained variance is accounted for by SES. From the row labeled U(Xi) it will be seen that 32 percent is unique to SES; from C(X1X2) that 32 percent is in common with FSS; from C(X1X3) that 1 percent is in common with RETH; and from C(X1X2X3) that 14 percent is in common with FSS and RETH.

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[4] One way to resolve some of these linkages would be to have actual measures over time.

[5] A description of the three-set case is given in appendix A and in the Technical Supplement.

It is clear from table 8.2 that ACHV has the largest squared multiple correlation, or *R-SQ(T)*, of all the dependent variables, followed closely by EDPLN and HBTS, which in turn are followed by EXPTN and ATTUD. The analyses for EXPTN show that the largest role is played by SES, and the next largest by FSS. It appears that RETH plays only a minimal role in EXPTN. Hence, in understanding EXPTN, SES looms largest followed closely by FSS.

The analyses for ATTUD show that, as for EXPTN, the largest role is played by SES. FSS plays the next largest role, and RETH is not far behind.

The analyses for EDPLN show that here, too, an overwhelmingly large role is played by SES. In comparison with SES, FSS, and RETH play negligible roles.

For HBTS, the greatest role is played by FSS, with 33 percent being unique and another 47 percent being in common with SES and RETH. However, most of this 47 percent is shared with SES, which plays the next largest role. Once again, the role of RETH appears to be negligible.

For ACHV, somewhat different results were obtained. As with the other variables, SES plays a large role. But here the resemblance ends. The next largest role is played by RETH, while the role of FSS is negligible.

In all, these analyses have shown that, for the PRCS measures, SES and FSS play the greatest roles, whereas for ACHV the greatest roles are played by SES and RETH. Since these three variables relate differently to the PRCS set than to ACHV it is appropriate to ask: What is the magnitude of the role played in ACHV by the set of PRCS measures when juxtaposed with the three HB measures? Table 8.3 shows how we attempted to answer this question. The figures indicate how the relative roles of SES, FSS, and RETH change when PRCS is introduced into the analysis. PRCS has by far the largest role, with a unique value of 23 percent. It is of interest to note that, while RETH has the next largest unique role, SES has the next largest *total* role. This indicates that when PRCS is introduced into the analysis more of the variance in SES moves up into the common portions. SES played a large role in the PRCS measures. Accordingly, when both are introduced into the analysis they have a great deal in common in the way they relate to ACHV. This shared variance leaves RETH with the second largest unique role. However, a large part of the shared portion for RETH (33 percent) is in common with SES and FSS (7 and 2 percent, respectively) ,while an even larger portion (13 percent) is in common with all four. Only 1 percent is common to RETH and PRCS, while another 9 percent is common to SES, RETH, and PRCS. For SES, which has the third largest unique role, most of the common variance occurs in some combination — either C(X1X4) or C(X1X2X4)—with PRCS being 18 and 6 percent, respectively. On the other hand, FSS has all of its variance shared with two or more of the other sets of variables. These analyses indicate that PRCS plays the largest role in ACHV, while RETH and SES run close seconds. The second largest unique role belongs to RETH, while SES has the second largest total role.

**Table 8.3.—Commonality Analyses of Three Home Background and Four Process Measures With Achievement, for 9th-Grade Students (N=133,136)**

| | Achievement | | | |
|---|---|---|---|---|
| | 1 SES | 2 FSS | 3 RETH | 4 PRCS |
| U(Xi) | 5 | 0 | 14 | 23 |
| C(X1X2) | 0 | 0 | .. | .. |
| C(X1X3) | 7 | .. | 7 | .. |
| C(X1X4) | 18 | .. | .. | 18 |
| C(X2X3) | .. | 0 | 0 | .. |
| C(X2X4) | .. | 0 | .. | 0 |
| C(X3X4) | .. | .. | 1 | 1 |
| C(X1X2X3) | 2 | 2 | 2 | .. |
| C(X1X2X4) | 6 | 6 | .. | 6 |
| C(X1X3X4) | 9 | .. | 9 | 9 |
| C(X2X3X4) | .. | 1 | 1 | 1 |
| C(X1X2X3X4) | 13 | 13 | 13 | 13 |
| Sum % | 60 | 22 | 47 | 71 |
| R-SQ (T) | .. | 47 | .. | .. |

Since PRCS does play the largest role, we would like to get some idea as to which aspects of it may be wielding the greatest influence. The analyses in table 8.4 are presented in order to help answer this very question. Preliminary analyses showed that the PRCS measures could be grouped into three subsets, one containing ATTUD, another EDPLN, and a third EXPTN and HBTS. Accordingly, three different kinds of analyses were conducted:

U: Commonality analyses of the three groups with ACHV are run without adjusting ACHV for any HB variables.

HB: ACHV is first adjusted for its association with the HB variables of SES and FSS, by using partial correlation techniques, and the commonality analyses are then run for these groups of variables.

HB′: Same as HB above except adjustments are also made for RETH.

These analyses, given in table 8.4, are organized in a somewhat different manner than heretofore. Thus the unitized commonality coefficients for each grouping of the PRCS variables are assembled under the heading for that

**Table 8.4.—Commonality Analyses of Process Measures With Achievement When Adjusted for Different Aspects of Home Background, for 9th-Grade Studnts (N=133,136)**

| | 1<br>Attitude Toward Life | | | 2<br>Educational Plans and Desires | | | 3<br>Expectations for Excellence and Study Habits | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | HB | HB′ | U | HB | HB′ | U | HB | HB′ |
| U(Xi) | 16 | 36 | 21 | 22 | 25 | 35 | 1 | 3 | 3 |
| C(X1X2) | 8 | 10 | 10 | 8 | 10 | 10 | ... | ... | ... |
| C(X1X3) | 6 | 3 | 2 | ... | ... | ... | 6 | 3 | 2 |
| C(X2X3) | ... | ... | ... | 11 | 5 | 8 | 11 | 5 | 8 |
| C(X1X2X3) | 36 | 20 | 20 | 36 | 20 | 20 | 36 | 20 | 20 |
| Sum % | 66 | 69 | 53 | 77 | 60 | 73 | 54 | 31 | 33 |
| RSQ(T) | ... | ... | ... | 34 | 16 | 17 | ... | ... | ... |

NOTE.—"U" designates that no adjustments in ACHV have been made; "HB" that ACHV has been adjusted for SES and FSS; and HB′ that ACHV has been adjusted for HB and RETH.

group. For example, under Attitude Toward Life are listed the commonality coefficients for the U, HB, and HB′ analyses. In this way it is possible to observe the relative behavior of the groups of variables as the different adjustments are made.

It will be seen from the R-*SQ*(*T*)'s for the different types of analysis that 34 percent of the total variation in ACHV is accounted for by these three groups of PRCS variables *before* any adjustments are made. After adjustments are made for HB, these variables account for 16 percent of the differences in ACHV that remain. After the HB′ adjustments, they account for 17 percent of the remaining differences. The percentage of variation in ACHV removed by these adjustments can be obtained from figure 4.1.

The column sums in table 8.4 show that the largest total role (viz, the sum of the unique and common portions) is greatest for EDPLN under the "U" analyses, but that when HB is adjusted for, ATTUD takes the lead. However, when adjustments are made for HB and RETH (viz, HB′), EDPLN again takes the lead. This is also true for the unique values for these two variables. Moreover, as these adjustments are made, the portion common to all three groups decreases, as can be seen from the row labeled C(X1X2X3). In contrast, the portion common to ATTUD and EDPLN increases, as do the unique values. However, under all adjustments, the unique values for EXPTN and HBTS are small, and most of their variance is in common with the other two sets. Thus it is clear that EDPLN tends to play the largest role in ACHV. But this role is moderated by ATTUD and RETH. However, this is true only so long as HB is not taken into account. After it is taken into account, ATTUD plays a greater role. The main reason for this seems to be that nonwhite students are less prone to believe they can influence events in their lives, even if they get a good education. When adjustments are made for their RETH, EDPLN again assumes the greatest role. However, ATTUD continues to play a sufficiently large role in the development of ACHV for us to conclude that both EDPLN and ATTUD are important variables in understanding ACHV.

Now that we have an understanding of the roles played by different aspects of the PRCS set in ACHV we may turn our attention to a consideration of the magnitude of the role played by the PRCS set when placed in context with possible school influences. The analyses in table 8.5 are designed to help answer the question: What is the magnitude of the role played by the PRCS set when juxtaposed with HB and the school variables? Two sets of variables were used to represent different aspects of the school. The first set, called SO, contained the five student body variables as described in chapter 1. The second set, called SCH, contained the comprehensive set of 31 school variables (also described in chapter 1). In order to display the role played by RETH two different kinds of analyses were run. The first used the two HB variables of SES and FSS; in table 8.5 it is labeled HB. The second, called HB(I), included RETH as an HB variable. As in the previous table, the results of the two unitized commonality analyses are organized in columnar form alongside one another for easy comparison.

**Table 8.5.—Commonality Analyses of Home Background, Process, and School Measures With Achievement, for 9th-Grade Students (N=133,136, divided among 923 schools)**

| | 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|---|
| | HB | HB(I) | PRCS | | SO | | SCH | |
| U(Xi) | 3 | 5 | 23 | 22 | 6 | 5 | 0 | 0 |
| C(X1X2) | 21 | 21 | 21 | 21 | ... | ... | ... | ... |
| C(X1X3) | 1 | 2 | ... | ... | 1 | 2 | ... | ... |
| C(X1X4) | 0 | 0 | ... | ... | ... | ... | 0 | 0 |
| C(X2X3) | ... | ... | (−)1 | (−)1 | (−)1 | (−)1 | ... | ... |
| C(X2X4) | ... | ... | 0 | 0 | ... | ... | 0 | 0 |
| C(X3X4) | ... | ... | ... | ... | 15 | 5 | 15 | 5 |
| C(X1X2X3) | 3 | 3 | 3 | 3 | 3 | 3 | ... | ... |
| C(X1X2X4) | 0 | 0 | 0 | 0 | ... | ... | 0 | 0 |
| C(X1X3X4) | 10 | 19 | ... | ... | 10 | 19 | 10 | 19 |
| C(X2X3X4) | | | 0 | (−)1 | 0 | (−)1 | 0 | (−)1 |
| C(X1X2X3X4) | 19 | 19 | 19 | 19 | 10 | 19 | 19 | 19 |
| Sum % | 57 | 69 | 65 | 63 | 53 | 51 | 44 | 42 |
| R SQ(T) | ... | ... | 52 | 53 | | | | |

NOTES.—HB designates the variables of SES and FSS; HB(I) the HB set with RETH included; PRCS the set of four process measures; SO the set of five School Outcomes; and SCH the set of 31 school variables.

The row labeled R-*SQ*(*T*) in table 8.5 shows that RETH adds very little to the percentage of variance explained after these other variables have been included in the analysis. The percentage sums show that the total roles change very little for PRCS, SO, and SCH. For HB, however, there is a 12 percent increase when RETH is included. The unique values for the different sets show very little change under the two kinds of analysis. By far the greatest unique role—about 4 times greater than that of SO and 4 to 7 times greater than that of HB—belongs to PRCS. The unique role of SO is in turn slightly greater than that of HB.

It will be seen from the common portions for PRCS that most of this set is in common either with HB (2 percent) or with all three other sets (19 percent), and that these values change very little for the two types of analysis. For the other sets of variables, however, the magnitude of the common portions does change for the two types of analysis. Thus for the SO and SCH sets about 10 percent of the variance that was common to them under the HB analysis (X3X4) moves to be shared with HB under the HB(I) analysis (X1X3X4). However, the other values for the SO and SCH sets remain much the same. In a sense, then, this 10 percent might be regarded as the variance in the SO and SCH sets that is uniquely associated with RETH after considerations of SES and FSS have been set aside. Similarly, the behavior of the coefficients in the HB and HB(I) columns change very little except for an approximately 10 percent increase in the common portion (X1X3X4), and a slight increase (2 percent) in the unique value. The very small values for the SCH set are due mainly to its heavy confounding with the SO and HB sets. Thus PRCS plays by far the greatest role in ACHV.

We now have a better idea of some of the possible linkages between each of the HB measures and each of the PRCS measures, and of these latter in turn with ACHV. However, we are still no closer to specifying kinds of linkages between ACHV and PRCS measures except to say that they are mutually influential. Further, we would probably be able to determine these influences only with measurements over a time sequence. We can, however, think of the PRCS and ACHV measures combined as being a set of outcomes that are to some extent influenced by the structural aspects of the family, on the one hand, and the school, on the other. In order to perform this kind of an analysis we need a generalization of the univariate commonality model to the multivariate case. That is, we need a generalization to the case where there is a single set containing two or more dependent variables and several sets of independent or regressor variables. Such a generalization is given in the Technical Supplement.[6] The analyses in table 8.6 are designed to help answer the question: What are the relative roles played in the combined PRCS-ACHV set by the three HB variables?

**Table 8.6.—Multivariate Commonality Analyses of Three Home Background Measures With Achievement and Motivation, for 9th-Grade Students (N=133,136, divided among 923 Schools)**

| | 1<br>SES | 2<br>FSS | 3<br>RETH |
|---|---|---|---|
| U(Xi) | 32 | 16 | 21 |
| C(X1X2) | 14 | 14 | . . |
| C(X1X3) | 6 | . . | 6 |
| C(X2X3) | . . | 0 | 0 |
| C(X1X2X3) | 11 | 11 | 11 |
| Sum % | 63 | 41 | 38 |
| R SQ(T) | . . | 66 | . . |

It will be seen from table 8.6 that 66 percent of the variation in this set of measures can be accounted for by SES, FSS, and RETH. Of these three measures SES has the largest total and unique roles. Of the 31 percent of SES variance that is in common, 14 percent is in common with FSS, 6 with RETH, and 11 with all three. RETH has the second largest unique role, although FSS has the second largest total role. Some 21 percent of the RETH variance is unique, while another 17 percent is shared, 6 percent with SES and 11 percent with both SES and FSS. Although FSS has the third largest unique value, 16 percent is still a substantial amount. Of the remaining 25 percent of variance associated with FSS, 14 percent is shared with SES and another 11 percent is shared with SES and RETH. These analyses have shown that, when both the attitudinal-motivational (PRCS) and achievement (ACHV) variables are considered together as a set of outcomes, they are all dependent upon SES, FSS, and RETH. However, this dependence tends to be greatest for SES, with RETH and FSS being second and third largest respectively, but close together in magnitude.

The analyses in table 8.7 are designed to help answer the question: What are the relative roles played in the combined PRCS-ACHV set by the HB and school variables? As before, the same sets of five SO and 31 SCH variables were used to represent different aspects of the school. Also as before, two different types of analyses were conducted. One type, called HB, used the two previous variables as well as RETH. Again, the results of the two types of analyses are organized in adjacent columns so that the relative behavior of the different sets can be observed.

**Table 8.7.—Multivariate Commonality Analysis of Home Background and School Measures With Achievement and Motivation, for 9th-Grade Students (N=133,136, divided among 923 schools)**

| | 1 | | 2 | | 3 | |
|---|---|---|---|---|---|---|
| | HB | HB(I) | SO | | SCH | |
| U(Xi) | 39 | 41 | 21 | 19 | 1 | 1 |
| C(X1X2) | 6 | 7 | 6 | 7 | . . | . . |
| C(X1X3) | (—)1 | (—)1 | . . | . . | (—)1 | (—)1 |
| C(X2X3) | . . | . . | 22 | 9 | 22 | 9 |
| C(X1X2X3) | 12 | 24 | 12 | 24 | 12 | 24 |
| Sum % | 56 | 71 | 61 | 59 | 34 | 33 |
| R SQ(T) | . . | . . | 92 | 93 | . . | . . |

The first noteworthy aspect of the results in table 8.7 is that, for both types of analysis, a large portion of the variance in the set of dependent variables can be accounted for by these three sets of variables. For both types of analysis the unique value for HB is largest—about twice that of SO, in fact, which is in turn second largest. Contrary to the results in table 8.5, the SCH set has a small unique value here. The main difference in the two types of analysis is that when RETH is included as an HB variable, about 12 percent of the variance that was in common with the SO and SCH sets (X2X3) moves up to the third order to be shared in common with all three sets. This 12 percent might be thought of as the percentage of the SO and SCH sets that is uniquely associated with RETH once considerations of SES and FSS have been put aside. The only other results due to type of analysis are for the unique value for HB to increase by 2 percent, for that of SO to decrease by 2 percent (when RETH is included as an HB variable), and for that of the shared portion of HB and SO, C(X1X2), to increase by 1 percent. Thus when the PRCS–ACHV set is treated as a combined set of outcomes, the role of home background variables tends to be about twice that of a set of variables that represents possible influences of the school.

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[6] Essentially, what this technique does is to transform the dependent variables into a set of orthogonal vectors, and compute the variance in each vector accounted for by different combinations of sets of variables to obtain R-squares. These R-squares are then used in the same computational algorithm as for univariate commonalities. In reality, however, these R-squares are actually the percent of the trace of this transformed matrix of dependent variables. Consequently, they do not have unity as their upper limit.

In sum: we have attempted in this section to shed light on possible causal linkages between student achievement and family attributes, both structural and behavioral. Also, investigated were the relationships of parents' behavioral activities with achievement when combined with certain structural aspects of the family, on the one hand, and possible school influences, on the other.

Our first set of analyses showed that of the three variables of SES, FSS, and RETH, the first two played the largest role in explaining the behavioral activities in which parents engage with their children (including the expectations they hold for them). For ACHV, however, SES and RETH respectively played the first and second greatest explanatory roles, in that order.

The next set of analyses showed that the role of the set of behavioral activities (called PRCS) in ACHV far outweighed that of any of the family's structural aspects (viz, SES, FSS, or RETH). Inquiry into those aspects of PRCS that might be most important in understanding ACHV showed that the students' plans for further schooling (EDPLN) and outlook on life (ATTUD) played the largest roles. When placed in context with a comprehensive range of 36 school variables, the set of variables called PRCS continued to play a very large role in ACHV. We also undertook analyses that treated both PRCS and ACHV as sets of outcomes that could be influenced by both the structural aspects of the family and the school. The results of these analyses showed that the role of each of the three structural variables was greater when ACHV and PRCS were taken as a combined set of dependent variables than was the case when ACHV alone was the dependent variable. When placed in context with school variables, both sets played larger roles than with only ACHV as the dependent variable. However, the unique role of the structural variables tended to outweigh that of the school variables by a factor of about 2 to 1.

## 8.3. ACHIEVEMENT AND RACIAL-ETHNIC GROUP DIFFERENCES

In chapter 4 we created a variable that captured the differences among racial-ethnic groups in their ACHV. This variable, called Racial-Ethnic Group Membership (RETH), assigned to each student the mean ACHV score attained by the members of his racial-ethnic group. A variable so created is said to be "criterion scaled," and its linear relationship with the dependent, or criterion, variable in the maximum that can be obtained for that variable (Beaton, 1969). In this section we shall examine the relationship of RETH with ACHV as progressively more variables are brought into the analysis. Specifically, the questions being addressed in this section are:

1. What is the maximum extent to which RETH can be related to ACHV?

2. What is the extent to which RETH is related to ACHV after different background variables have been taken into account?

3. What is the magnitude of the relative roles of these background variables when juxtaposed with RETH?

The first two questions are taken up for grades six, nine, and 12, and the results shown in figure 8.1.[7] The third question, however, is addressed only for grade nine. These results will also be found in figure 8.1, which shows the percent of variation in ACHV accounted for by RETH after the following variables have been taken into account:

NONE: This is the squared correlation of RETH with ACHV before the relationship of any other variables with ACHV has been taken into account. These values (24 percent, 22 percent, and 20 percent for grades six, nine, and 12, respectively) represent the maximum percentage of variation in ACHV that can be associated with a student's Racial-Ethnic Group Membership.

SES: These values of 10.9, 7.5, and 8.9 percent for grades six, nine, and 12, respectively, represent the percentage of variation in ACHV associated with RETH after a student's Socio-Economic Status (SES) has been taken into account. These values are obtained by subtracting from the R-square that results when both SES and RETH are entered into the regression the value that results when only SES is entered in the regression. Accordingly, the values are the unique commonality coefficients for RETH.[8]

HB: These values of 9.3, 7.0, and 8.6 percent for grades six, nine, and 12, respectively, represent the percentage of variation in ACHV associated with RETH after the two home background variables of SES and FSS have been entered into the analysis..

FB: These values of 8.5, 6.5, and 8.9 percent for grades six, nine, and 12, respectively, represent the percent of variation in ACHV associated with RETH after PRCS has been entered into the analysis.

FB, A: These values of 7.6, 6.0, and 7.4 percent for grades six, nine, and 12, respectively, represent the percent of variation in ACHV associated with RETH after FB and A have been entered into the analysis.

FB, A, SO: These values of 1.2, 1.0, and 1.1 percent for grades six, nine, and 12 respectively, represent the percent of variation in ACHV associated with RETH after FB, A, and SO have been entered into the analysis. The five school outcome measures represent both the aggregate influence of the school's staff and facilities and the achievement and motivational levels of the student body.

What these analyses have shown is that the maximum difference among students in ACHV that is associated with RETH is about 24 percent. Moreover, as increasing numbers of variables pertaining to the student's back-

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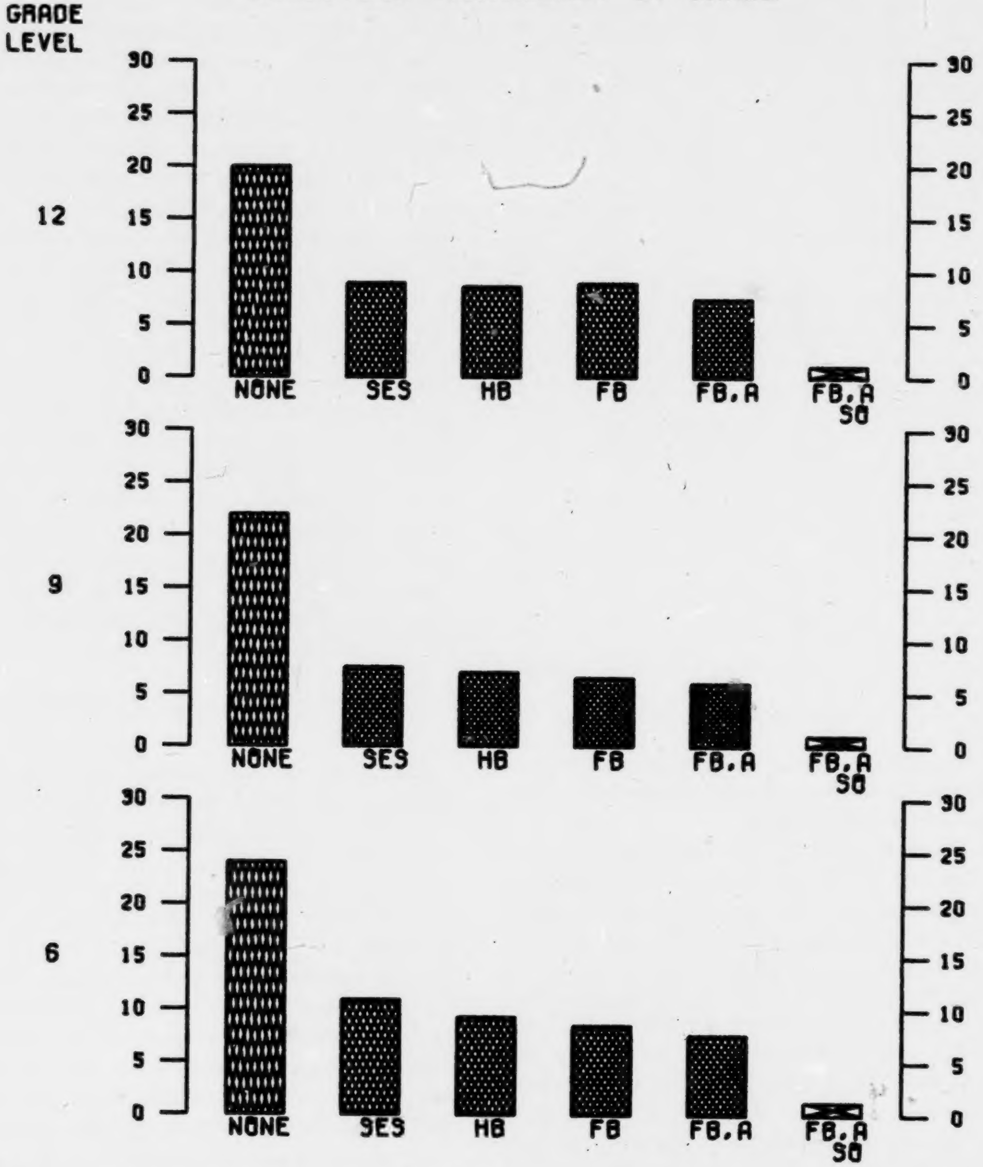
[7] The number of students used in these analyses is shown in table 7.1.

[8] The general procedure used here is to subtract from the R-square obtained when both RETH and the set of background variables are entered into the regression the R-square obtained when only the background variables are entered.

FIGURE 8.1. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY RACIAL-ETHNIC GROUP MEMBERSHIP AS A FUNCTION OF SOCIAL CONDITION VARIABLES, BY GRADE



ground are brought into the analysis, such as the social and economic well-being of the family (HB), the involvement of the parents with their child (PRCS), the area of the country in which they reside (A), and the achievement and motivational levels of the student body (SO), the magnitude of the role played by RETH becomes smaller and smaller, finally dwindling to a value of about 1 percent. However, it must be admitted that if the sets of variables in figure 8.1 had been entered into the analysis in a different order, this declining trend might have been more or less gradual than the one observed. In order to observe the confounding of these five sets of variables (HB, PRCS, SO, A, and RETH) with one another, a commonality analysis was conducted for the ninth grade. This kind of analysis resolves the order-of-inclusion problem because it involves all possible combinations of the sets of variables.

The commonality analyses in table 8.8 have been unitized in order to make the coefficients more readily interpretable. We can note that the total R-square is 53 percent, which indicates that a little better than half the total variation in ACHV is explained by these five sets of variables. The unitizing operation, which is performed by dividing each of the coefficients by 53, raises the magnitude of each coefficient. For example, the unique value for RETH (when all five sets are in the analysis) is raised from 1 percent (figure 8.1) to 2 percent (table 8.8). Since our interest is in the relative explanatory role

Table 8.8.—Commonality Analyses of Social Condition Variables and Racial-Ethnic Group Membership With Achievement, for 9th-Grade Students (N=133,136, divided among 923 schools)

| | 1<br>HB | 2<br>PRCS | 3<br>SO | 4<br>AREA | 5<br>RETH |
|---|---|---|---|---|---|
| U(Xi) | 2 | 22 | 8 | 0 | 2 |
| C(X1X2) | 16 | 16 | .. | .. | .. |
| C(X1X3) | 2 | .. | 2 | .. | .. |
| C(X1X4) | 0 | .. | .. | 0 | .. |
| C(X1X5) | 1 | .. | .. | .. | 1 |
| C(X2X3) | .. | (—)1 | (—)1 | | .. |
| C(X2X4) | .. | 0 | 0 | 0 | .. |
| C(X2X5) | .. | 0 | .. | .. | 0 |
| C(X3X4) | .. | .. | 2 | 2 | .. |
| C(X3X5) | .. | .. | 9 | .. | 9 |
| C(X4X5) | .. | .. | .. | 0 | 0 |
| C(X1X2X3) | 5 | 5 | 5 | .. | .. |
| C(X1X2X4) | 0 | 0 | 0 | 0 | .. |
| C(X1X2X5) | 4 | 4 | .. | .. | 4 |
| C(X1X3X4) | 1 | .. | 1 | 1 | .. |
| C(X1X3X5) | 7 | .. | 7 | .. | 7 |
| C(X1X4X5) | 0 | .. | .. | 0 | 0 |
| C(X2X3X4) | .. | 0 | 0 | 0 | .. |
| C(X2X3X5) | .. | 0 | 0 | .. | 0 |
| C(X2X4X5) | .. | 0 | .. | 0 | 0 |
| C(X3X4X5) | .. | .. | 2 | 2 | 2 |
| C(X1X2X3X4) | 1 | 1 | 1 | 1 | .. |
| C(X1X2X3X5) | 15 | 15 | 15 | .. | 15 |
| C(X1X2X4X5) | 0 | 0 | .. | 0 | 0 |
| C(X1X3X4X5) | 1 | .. | 1 | 1 | 1 |
| C(X2X3X4X5) | .. | 0 | 0 | 0 | 0 |
| C(X1X2X3X4X5) | 2 | 2 | 2 | 2 | 2 |
| Sum % | 57 | 64 | 54 | 9 | 43 |
| R SQ(T) | .. | .. | 53 | .. | .. |

of the different sets, this presents no problem. However, we should recognize that the relative magnitudes are larger than the absolute magnitudes.

It is clear from table 8.8 that by far the largest unique value occurs for the set of PRCS measures. This value is almost 3 times greater than that for SO and 11 times greater than that for HB and RETH. For the second-order coefficients, C(XiXj), the largest values occur for HB and PRCS, and for SO and RETH. At the third order, C(XiXjXk), the largest values occur for: HB, PRCS, and RETH; and HB, SO, and RETH. At the fourth order, the only large value is for HB, PRCS, SO, and RETH. It is of particular interest to note that this fourth-order value is exceeded only by the second-order coefficient for HB and PRCS and by the unique value for PRCS. Clearly, there is a great deal of overlap in the way these variables relate to ACHV.

Another way of looking at this is to subtract the unique value for each set of variables from its column sum (the "Sum %" of table 8.2 and elsewhere). This remainder gives the percent of common variance for a set that is confounded with the other sets. For example, the common variance in HB that is confounded with the four other sets is obtained by taking the difference 57 − 2 = 55. Thus, 55 percent of the common variance for HB is confounded with the other four sets. The corresponding values for the other sets are: PRCS 42; SO 46; A 9; and RETH 41. Thus, all the variance in A is in common with the other four sets, while almost all the variance for RETH is also confounded. In view of this extensive confounding of RETH with these other sets of variables which are primarily social in nature, it is difficult to assert that differences in ACHV associated with RETH rise from any *inherent* predisposition of one group as compared with another. Indeed, the origin of these differences appears to be more social in nature.

In summary, analyses in this section have shown that about 24 percent of the differences among students in their ACHV is the maximum that can be associated with their RETH. However, after a variety of background conditions have been taken into account, such as the social and economic well-being of the family, their involvement with their child in educationally related child-rearing activities, the family's area of residence, and the achievement and motivational levels of the student body, the maximum percentage of ACHV that can be associated with RETH is about 1 percent. Thus almost all (23 percent) of the differences among students in their ACHV that can be associated with their RETH are explained by sets of variables that are primarily social in nature and origin. It is therefore difficult to assert that the differences in Achievement associated with Racial-Ethnic Group Membership arise from any inherent predispositions of one group as compared with another. Indeed, these analyses, as well as others in this monograph, suggest lines along which the equalization of racial-ethnic differences in achievement might occur.

## 8.4. SEX GROUP DIFFERENCES AND EDUCATIONAL PLANS

For many of the analyses in this study, sex has been used as a stratifying variable. This has allowed us to compare the extent to which the same sets of variables relate differentially to ACHV by sex. Indeed, we saw in chapter 3 that, after adjustments in ACHV were made for HB, male EDPLN played a greater role in ACHV relative to the other PRCS measures than was the case for females. Also in chapter 3 we noted that there were slight differences in mean ACHV in favor of females, although these were not always consistent across groups. These results suggest two questions that are of interest to us. The first one, which pertains to the mean differences on each of the family background measures, is:

1. To what extent are sex differences associated with each of the family background measures for each racial-ethnic group?

The second question builds upon the results of chapter 3 by asking about the nature of sex differences in the roles played by EXPTN, ATTUD, and HBTS in EDPLN, after adjustments have been made in EDPLN for HB and ACHV. Adjustments are made for HB first because proportionately more of the children of affluent parents tend to go on to college. Adjustments are also made for ACHV because the higher ACHV students also tend to go on to college, regardless of their family's affluence. Accordingly, these analyses look at the possible determinants of EDPLN for each sex that are independent of HB and ACHV. The question posed is:

2. What is the nature of the differences in the way EXPTN, ATTUD, and HBTS relate to EDPLN for each sex after adjustments have been made for HB and ACHV?

To shed light on the first question the correlations of each of the family background measures with sex are given in table 8.9.[9] For these analyses sex was coded as a variable, with females receiving a high and males a low score. Hence a positive correlation indicates that females have a higher mean score on the variables than males, while a negative correlation indicates that males have a higher score. The greater the mean difference between the sex groups on the variable the larger will be the magnitude of the correlation obtained.

**Table 8.9.—Correlates of Sex Differences, by Racial-Ethnic Group**

| | Racial-Ethnic Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | I | M | PR | N | O | W | T | T(A) |
| SES | 01 | 02 | −04 | −03 | 02 | 01 | 00 | 00 |
| FSS | 03 | 03 | 02 | 02 | 03 | 02 | 02 | 02 |
| EXPTN | −03 | −01 | −04 | 05 | 02 | −01 | 01 | 01 |
| ATTUD | 04 | 08 | 06 | 11 | 11 | 08 | 08 | 08 |
| EDPLN | 04 | −02 | 02 | 08 | 04 | −07 | −04 | −04 |
| HBTS | 11 | 09 | 08 | 11 | 06 | 15 | 13 | 13 |
| ACHV | 01 | 04 | 04 | 02 | 03 | 05 | 04 | 04 |
| M.C. | 15 | 15 | 15 | 15 | 12 | 23 | 19 | 19 |

NOTE.—I = Indian; M = Mexican-American; PR = Puerto Rican; N = Negro; O = Oriental-American; W = white; T = total; T(A) = total after adjusting for Racial-Ethnic Group; and M.C. = multiple correlation.

It will be seen from table 8.9 that sex differences are low for nearly all variables. They are particularly low for SES and FSS, as well as for all groups combined both before and after adjustments were made for RETH. They are also low for EXPTN, but are slightly higher for the remaining variables. For ATTUD, females uniformly report a more favorable outlook than do males. Females also score better on HBTS than males, and have slightly higher levels of ACHV. Values for EDPLN indicate that males have slightly higher aspirations overall. However, these relationships do differ by sex. Thus white and Mexican-American males display higher aspirations, but the opposite is true of Indians, Puerto Ricans, Negroes, and Oriental-Americans. Of course, it may be that, for some of these groups, those students who have remained in school hope to remain in school even longer. The row in table 8.9 labeled M.C. gives the multiple correlation of these seven variables, with sex in the dependent role. These values show that, except for whites, the groups are very similar. Oriental-Americans score lowest and whites highest; the other four groups are close to the former. Thus sex differences are more predictable or more fully explained from these variables for whites than for the others.

However, we may still wonder why, although many of the differences between males and females are negligible, while still others are in favor of the females, proportionately fewer females go on to higher education and achieve eminence. Obviously, many factors beyond the scope of these data are operating to produce these differences. However, one factor that is available for analysis here is the role that EXPTN, as well as ATTUD and HBTS, might play in the EDPLN of boys as compared with girls. Since this question has several parts let us deal with them in the order in which they occur.

We said earlier that since EDPLN was dependent upon the student's HB and ACHV, we would want to eliminate these relationships before looking at the relationships of EXPTN, ATTUD, and HBTS with EDPLN. Our purpose in performing these adjustments is to find out how much of the variation in EDPLN is thereby eliminated, as well as the percent of variation in EDPLN associated with these three variables after the adjustments have been made. The figures for these analyses are given in table 8.10.[10]

**Table 8.10.—Percent of Variation in Educational Plans Eliminated by Home Background and Achievement and Associated With Expectations for Excellence, Attitude Toward Life, and Study Habits, by Sex**

| | Eliminated | | | Associated | | |
|---|---|---|---|---|---|---|
| Group | M | F | T | M | F | T |
| Indian | 31 | 23 | 27 | 27 | 19 | 23 |
| Mexican | 30 | 26 | 28 | 20 | 17 | 18 |
| Puerto Rican | 32 | 31 | 31 | 22 | 18 | 20 |
| Negro | 28 | 25 | 26 | 26 | 22 | 24 |
| Oriental | 43 | 39 | 41 | 32 | 17 | 26 |
| White | 41 | 36 | 38 | 18 | 14 | 15 |
| Total | 38 | 28 | 33 | 20 | 16 | 18 |
| Total (A)[a] | 40 | 33 | 36 | 20 | 16 | 17 |

[a] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

It will be seen from the figures in the "Eliminated" column in table 8.10 that there is a uniformly greater dependence of EDPLN on HB and ACHV for males than for females. It follows that more variance in EDPLN is eliminated for males than for females by these adjustments. The magnitude of the male-female differences in the percentage eliminated is in descending order: Indians, whites, Oriental-Americans, Mexican-Americans, Negroes, and Puerto Ricans. When the column labeled "Associated" is examined to see which group has the greatest percentage of variation in EDPLN associated with the three variables of EXPTN, ATTUD, and HBTS, it becomes clear that there is a uniformly greater level of association for males than for females. However, the order of magnitude for the male-female differences in the percentage associated is from greatest to least: Oriental-Americans; Indians; and all other groups. Hence, both the dependence of EDPLN on HB and ACHV and the level of explanation of EDPLN from these three variables (after adjustment for HB and ACHV) are uniformly greater for males than for females. The magnitude of these sex differences does depend, however, on the particular racial-ethnic group.

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[9] The number of 9th-grade students entered in these analyses is given in table 7.2.

[10] The number of students in these analyses is given in table 7.2.

The next analyses, given in table 8.11, of the relative roles played by EXPTN, ATTUD, and HBTS. The results of these commonality analyses have been unitized to make them more readily comparable across groups. We should recognize that, since the level of association of EDPLN from these three variables is greater for males than for females, the absolute roles would be greater for them too. But since we are interested in comparing the relative roles across groups, our unitizing operation divides out these differences. The results of these analyses are presented in a somewhat different manner than heretofore. In order to facilitate comparisons by sex, the column of commonality coefficients for each separate variable and each sexually differentiated group is presented in adjacent columns. The row labeled "Sum %" contains the sum of all the percentages in that column. It represents the proportion of common variance associated with that variable. Here, the results by sex for each separate variable and racial-ethnic group will be dealt with first, and then comparisons made of the different variables. For example, the results of HBTS for each group will first be summarized, and then comparisons made for each of the other variables in turn. Major emphasis will be given to the unique values in each case.

It will be seen from the unique values for HBTS in table 8.11 that this variable plays a greater relative role for male than for female Mexican-Americans, Puerto Ricans, and Negroes, and for female rather than male Indians, Oriental-Americans, and whites, although the differences for these latter two groups are rather slight. When all groups are combined, HBTS plays a greater role for males than for females. However, the extent of this difference is lessened somewhat after adjustments are made for RETH.

The results for ATTUD are not nearly as consistent as for the other variables, nor is the role played by ATTUD as large. ATTUD plays a greater relative role for female than for male Puerto Ricans, Negroes, and whites, and after the groups have been combined and adjusted for RETH. For Indians the role of ATTUD is equal for the two groups, while for Mexican-Americans and all groups combined they are approximately equal.

We have seen that EXPTN plays a uniformly greater relative role in EDPLN for girls than for boys, independently of their HB and ACHV. The results for the other two variables are not nearly as consistent: the male role of HBTS exceeds that for females only for Indians, Oriental-Americans, and whites, while ATTUD has a greater role for female than for male Puerto Ricans, Negroes, and whites. For all groups, mean sex differences in SES, FSS, and EXPTN are negligible. Females have a uniformly more favorable outlook on life (ATTUD), more favorable study habits (HBTS), and slightly higher ACHV levels than males. Mexican-American and white males report slightly higher aspirations (EDPLN) than do females; however, for the other groups the reverse is true. For a combination of these seven variables sex differences were more fully explained for whites than for the other groups. Analyses of sex differences in the roles played in EDPLN by HBTS, EXPTN, and ATTUD that

**Table 8.11.—Commonality Analyses of Study Habits, Expectations for Excellence, and Attitude Toward Life With Educational Plans, After Adjusting for Home Background and Achievement, by Racial-Ethnic Group and Sex**

| | 1<br>HBTS | | | 2<br>EXPTN | | | 3<br>ATTUD | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | F | T | M | F | T | M | F | T |
| **INDIAN** | | | | | | | | | |
| U(Xi) | 30 | 32 | 32 | 19 | 23 | 20 | 1 | 1 | 1 |
| C(X1X2) | 27 | 22 | 24 | 27 | 22 | 24 | . . | . . | . . |
| C(X1X3) | 6 | 7 | 6 | . . | . . | . . | 6 | 7 | 6 |
| C(X2X3) | . . | . . | . . | 3 | 2 | 2 | 3 | 2 | 2 |
| C(X1X2X3) | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 |
| Sum % | 77 | 75 | 76 | 63 | 61 | 60 | 24 | 24 | 23 |
| **MEXICAN-AMERICAN** | | | | | | | | | |
| U(Xi) | 28 | 21 | 25 | 28 | 35 | 32 | 2 | 1 | 1 |
| C(X1X2) | 20 | 23 | 21 | 20 | 23 | 21 | . . | . . | . . |
| C(X1X3) | 6 | 5 | 5 | . . | . . | . . | 6 | 5 | 5 |
| C(X2X3) | . . | . . | . . | 4 | 3 | 4 | 4 | 3 | 4 |
| C(X1X2X3) | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Sum % | 66 | 61 | 63 | 64 | 73 | 70 | 24 | 21 | 22 |
| **PUERTO RICAN** | | | | | | | | | |
| U(Xi) | 24 | 19 | 23 | 20 | 28 | 23 | 5 | 8 | 6 |
| C(X1X2) | 17 | 18 | 17 | 17 | 18 | 17 | . . | . . | . . |
| C(X1X3) | 11 | 8 | 10 | . . | . . | . . | 11 | 8 | 10 |
| C(X2X3) | . . | . . | . . | 5 | 7 | 6 | 5 | 7 | 6 |
| C(X1X2X3) | 17 | 13 | 15 | 17 | 13 | 15 | 17 | 13 | 15 |
| Sum % | 69 | 58 | 65 | 59 | 66 | 61 | 38 | 36 | 37 |
| **NEGRO** | | | | | | | | | |
| U(Xi) | 19 | 14 | 17 | 18 | 25 | 20 | 5 | 9 | 6 |
| C(X1X2) | 20 | 18 | 19 | 20 | 18 | 19 | . . | . . | . . |
| C(X1X3) | 5 | 6 | 6 | . . | . . | . . | 5 | 6 | 6 |
| C(X2X3) | . . | . . | . . | 9 | 11 | 10 | 9 | 11 | 10 |
| C(1X2X3) | 23 | 18 | 21 | 23 | 18 | 21 | 23 | 18 | 21 |
| Sum % | 67 | 56 | 63 | 70 | 72 | 70 | 42 | 44 | 43 |
| **ORIENTAL-AMERICAN** | | | | | | | | | |
| U(Xi) | 17 | 27 | 22 | 26 | 27 | 26 | 6 | 1 | 5 |
| C(X1X2) | 21 | 25 | 23 | 21 | 25 | 23 | . . | . . | . . |
| C(X1X3) | 6 | 5 | 6 | . . | . . | . . | 6 | 5 | 6 |
| C(X2X3) | . . | . . | . . | 8 | 3 | 6 | 8 | 3 | 6 |
| C(X1X2X3) | 17 | 12 | 15 | 17 | 12 | 15 | 17 | 12 | 15 |
| Sum % | 61 | 69 | 66 | 72 | 67 | 70 | 37 | 21 | 32 |
| **WHITE** | | | | | | | | | |
| U(Xi) | 16 | 17 | 13 | 35 | 36 | 40 | 5 | 8 | 6 |
| C(X1X2) | 19 | 16 | 16 | 19 | 16 | 16 | . . | . . | . . |
| C(X1X3) | 5 | 6 | 5 | . . | . . | . . | 5 | 6 | 5 |
| C(X2X3) | . . | . . | . . | 8 | 8 | 8 | 8 | 8 | 8 |
| C(X1X2X3) | 13 | 10 | 11 | 13 | 10 | 11 | 13 | 10 | 11 |
| Sum % | 53 | 49 | 45 | 75 | 70 | 75 | 31 | 32 | 30 |
| **TOTAL** | | | | | | | | | |
| U(Xi) | 18 | 14 | 15 | 33 | 42 | 39 | 3 | 4 | 3 |
| C(X1X2) | 22 | 19 | 20 | 22 | 19 | 20 | . . | . . | . . |
| C(X1X3) | 4 | 4 | 4 | . . | . . | . . | 4 | 4 | 4 |
| C(X2X3) | . . | . . | . . | 6 | 7 | 6 | 6 | 7 | 6 |
| C(X1X2X3) | 14 | 11 | 13 | 14 | 11 | 13 | 14 | 11 | 13 |
| Sum % | 58 | 48 | 52 | 75 | 79 | 78 | 27 | 26 | 26 |
| **TOTAL (A)**[a] | | | | | | | | | |
| U(Xi) | 17 | 16 | 15 | 30 | 34 | 34 | 4 | 6 | 4 |
| C(X1X2) | 20 | 17 | 18 | 20 | 17 | 18 | . . | . . | . . |
| C(X1X3) | 5 | 5 | 5 | . . | . . | . . | 5 | 5 | 5 |
| C(X2X3) | . . | . . | . . | 7 | 7 | 7 | 7 | 7 | 7 |
| C(X1X2X3) | 15 | 12 | 13 | 15 | 12 | 13 | 15 | 12 | 13 |
| Sum % | 57 | 50 | 51 | 72 | 70 | 72 | 31 | 30 | 29 |

[a] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

were independent of HB and ACHV showed that parental expectations played a uniformly greater role for females than for males. Sex differences were also observed in the roles played by ATTUD and HBTS, but these differences varied by racial-ethnic group.

## 8.5. REGIONAL VARIATIONS BY SEX AND RACIAL-ETHNIC GROUP

When the roles of family background and school factors were examined by different regions in chapter 6, we would also have liked to examine these same relationships by sex and racial-ethnic group within and across regions. Unfortunately, neither at the ninth nor at the 12th grade was a sufficient number of schools available to allow for such an analysis. However, at the sixth grade a total of 2,370 schools were available. Even this number did not allow us to perform all the stratified analyses we wanted to do. But some of them were made possible through various modifications.

The first modification allowed us to conserve degrees of freedom by reducing the number of school variables used in the analyses. Analyses in chapter 6 had shown that the two most potent sets of variables in ACHV independent of family background (FB) were the five teacher attributes, called T(5), and the set of five student body variables, called SO. To represent different aspects of the school we used these 10 variables in lieu of the 16 to 22 variables used in chapter 6. The second modification was to reduce the regional groups to North versus South, since these were the two groups from the regional analyses in chapters 3 and 6 that showed the greatest mean differences, as well as differences in the magnitude of the role played by school factors. To represent FB we used the same set of six variables of SES, FSS, EXPTN, ATTUD, EDPLN, and HBTS. The set of 10 school variables was designated SCH. The general question being asked was:

How does the relative role of SCH factors in ACHV differ for each group in the North when compared with its counterpart in the South?

Emphasis will not be given to the role of FB factors, since they were discussed in considerable detail in chapter 3. Table 8.12 gives the percent of total students (P*t*) and percent of each group that is male (P*n*) for North and South. For example, the total number of students in the North (58 percent of *N*) has a 2 percent representation of Indians, 5 percent of Mexican-Americans, etc. The corresponding values for the South (48 percent of the total) are 3 percent for Indians and 9 percent for Mexican-Americans. In the North 54 percent of the Indians are males while in the South the corresponding value is 55 percent. Of the total number of schools (*n* = 2,370) 52 percent are in the North, and of this northern total 33 percent of the schools are represented for Indians. The proportions for schools are not mutually exclusive since many of the students, particularly nonwhites, go to school with one another. The total of 2,370, however, does represent a count of each separate school, i.e., no school is counted more than once in that total. This table shows that slightly more students and schools come from the North. For groups other than Negroes and whites, there is a greater number of males than of females. For Negroes there are slightly more females than males in both the North and South, whereas the whites are evenly distributed in both regions. The small percentages for Oriental-Americans suggest that we should treat their results with caution.

**Table 8.12.—Percent of 6th-Grade Students and Schools, by Region, Sex, and Racial-Ethnic Group Membership (N=118,107, divided among 2,370 schools)**

| | $P_t$ | | $P_m$ | | $P_n$ | |
|---|---|---|---|---|---|---|
| | North | South | North | South | North | South |
| Indian .......... | 2 | 3 | 54 | 55 | 33 | 28 |
| Mexican .......... | 5 | 9 | 57 | 59 | 49 | 57 |
| Puerto Rican ..... | 2 | 3 | 55 | 61 | 23 | 35 |
| Negro .......... | 20 | 40 | 47 | 46 | 46 | 65 |
| Oriental .......... | 1 | 1 | 53 | 62 | 14 | 8 |
| White .......... | 68 | 42 | 50 | 50 | 92 | 60 |
| Total .......... | 58 | 42 | 50 | 50 | 52 | 48 |

NOTE.—$P_t$ = percent of total students; $P_m$ = percent male; and $P_n$ = percent of total schools. Since many students attend the same schools, $P_n$ = does not sum to 100.

Figure 8.2 presents a comparison of the *R*-squares for North and South. For almost every group the percentages for the FB set alone (the shaded portion), or the FB and SCH set combined (the shaded and plain portions) are greater in the South than in the North. A slight exception occurs for Negroes, for whom the FB percentages are about equal for each region. This regional trend also holds when the groups are examined by sex. For each group except whites the plain portion, which represents the contribution of the SCH set after differences in FB have been taken into account, is greater in the South than in the North. These regional results are similar to those obtained in chapter 6 (p. 46). We found there that the role of SCH factors that was independent of FB factors was greater in the South than in the North even when all students were combined and RETH was included as an aspect of FB (see figure 6.1 and table 6.1). However, the percentages observed here for each separate racial-ethnic group are greater than those in figure 6.1, which were for all the groups combined.

These regional differences in the plain portions (that is, South minus North) are on the order of 10 percent for Indians and Negroes, 7 and 6 percent for Oriental- and Mexican-Americans respectively, and 3 percent for Puerto Ricans. There are no regional differences in the values for whites, while the value for all groups combined ("Total") is on the order of 5 percentage points greater in the North than in the South. The regional differences in these plain portions are consistently greater for males than for females—once more, with the exception of whites. The most attractive explanation of these differences is the greater diversity of students in the South with regard to ACHV, FB, and SCH (in our analysis, this shows up in the form of larger standard deviations). However, we cannot overlook the fact that institutions and institutional practices based upon color and caste are more highly developed in the South than in the North, and that these practices may play a role in pro-

FIGURE 8.2. - PERCENT OF VARIATION IN 6TH-GRADE ACHIEVEMENT ACCOUNTED FOR BY FAMILY BACKGROUND AND SCHOOL FACTORS, BY REGION, SEX, AND RACIAL-ETHNIC GROUP MEMBERSHIP

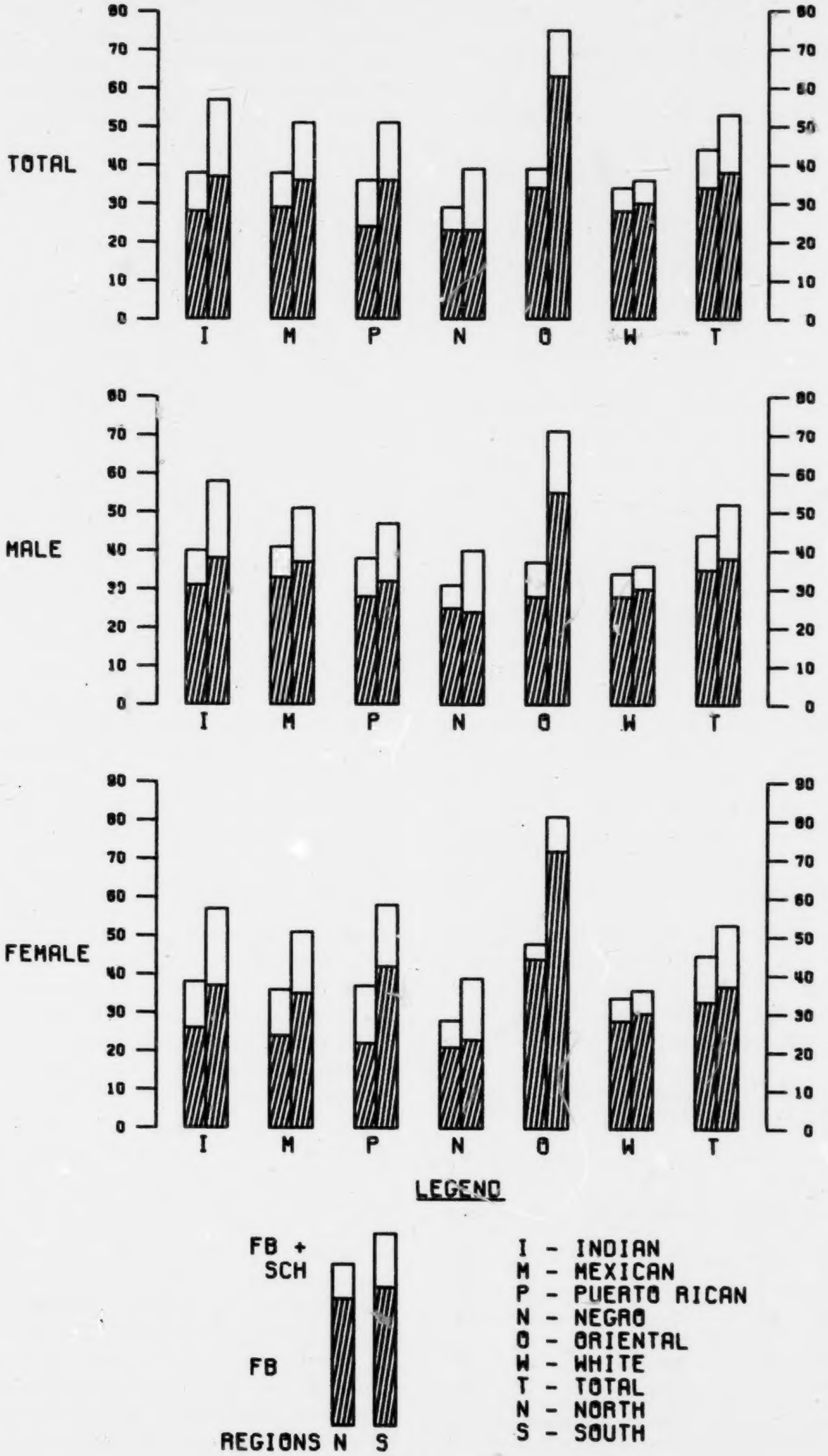

Fig. 8.2 (21a)

Table 8.13.—The Roles of Family Background and School Factors in 6th-Grade Achievement, by Region, Sex, and Racial-Ethnic Group Membership

| Group | | Total | | | Male | | | Female | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | FB | SCH | Common | FB | SCH | Common | FB | SCH | Common |
| Indian | North | 52 | 26 | 22 | 56 | 22 | 22 | 46 | 32 | 22 |
| | South | 27 | 34 | 39 | 31 | 33 | 36 | 20 | 35 | 45 |
| Mexican | North | 51 | 24 | 25 | 51 | 20 | 29 | 46 | 33 | 21 |
| | South | 29 | 29 | 42 | 29 | 28 | 43 | 26 | 32 | 42 |
| Puerto Rican | North | 58 | 32 | 10 | 65 | 26 | 9 | 44 | 41 | 15 |
| | South | 37 | 30 | 33 | 37 | 31 | 32 | 34 | 28 | 38 |
| Negro | North | 65 | 22 | 13 | 65 | 19 | 16 | 60 | 27 | 13 |
| | South | 41 | 40 | 19 | 41 | 40 | 19 | 40 | 42 | 18 |
| Oriental | North | 78 | 13 | 9 | 63 | 23 | 14 | 80 | 7 | 13 |
| | South | 29 | 16 | 55 | 33 | 22 | 45 | 22 | 12 | 66 |
| White | North | 68 | 17 | 15 | 68 | 17 | 15 | 67 | 17 | 16 |
| | South | 63 | 16 | 21 | 63 | 15 | 22 | 63 | 17 | 20 |
| Total (U)[a] | North | 46 | 23 | 31 | 48 | 21 | 31 | 43 | 26 | 31 |
| | South | 32 | 29 | 39 | 33 | 27 | 40 | 30 | 31 | 39 |
| Total (I)[b] | North | 46 | 13 | 41 | c | c | c | c | c | c |
| | South | 33 | 13 | 54 | c | c | c | c | c | c |
| Total (A)[d] | North | 64 | 23 | 13 | c | c | c | c | c | c |
| | South | 53 | 25 | 22 | c | c | c | c | c | c |

NOTE.—R-squares for Total (I) and Total (A) are: T(I)—North 45, South 55; T(A)—North 32, South 38.

[a] Total when Racial-Ethnic Group Membership is not included in the analysis.

[b] Total when Racial-Ethnic Group Membership is included as a Home Background variable.

[c] Not available.

[d] Total after the role of Racial-Ethnic Group Membership in Achievement has been partialed out.

ducing this diversity, as well as influence relationships among the different sets of variables. We will have more to say on this latter point after we have looked at the results of the commonality analyses.

Here as elsewhere, of course, there may be a good deal of overlap or confounding of the FB and SCH sets as they relate to ACHV. In order to display the role of each of these sets, as well as to allow comparison among the different regional groups, the results of unitized commonality analyses are presented in table 8.13. These analyses show that, for each of the sexually differentiated racial-ethnic groups except Puerto Ricans and whites, there is a tendency for the role of SCH factors to be greater in the South than in the North (the same is true of their confounding with FB factors). This trend is also applicable to Puerto Rican males but not, for some reason, to Puerto Rican females. For the latter, the overlap is still greater in the South than in the North, but the role of SCH factors is greater in the North. For whites the overlap is greater in the South. However, the role of SCH factors is slightly greater in the North for white males. For every group, the role of FB factors is greater in the North than in the South, often to a substantial extent.

When we examine the extent to which the role of FB exceeds that of the SCH factors we find considerable differences between North and South. The extent of these differences can be gauged by dividing the role of FB by that of SCH. When the resulting ratio is greater than one it shows that FB exceeds SCH—the larger the value, the greater the extent to which it does so. When the ratio is one the roles are more nearly equal. When it is less than one, it shows that SCH exceeds FB—the smaller the value, the greater the extent to which it does so.

| Group | FB/SCH | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Male | | Female | |
| | N | S | N | S | N | S |
| Indian American | 2.0 | .8 | 2.5 | .9 | 1.4 | .6 |
| Mexican-American | 2.1 | 1.0 | 2.6 | 1.0 | 1.4 | .8 |
| Puerto Rican | 1.8 | 1.2 | 2.5 | 1.2 | 1.1 | 1.2 |
| Negro | 2.9 | 1.0 | 3.4 | 1.0 | 2.2 | .9 |
| Oriental-American | 6.0 | 1.8 | 2.7 | 1.5 | 11.4 | 1.8 |
| White | 4.0 | 3.9 | 4.0 | 4.2 | 3.9 | 3.7 |
| Total (U) | 2.0 | 1.1 | 2.3 | 1.2 | 1.6 | .9 |
| Total (I) | 3.5 | 2.5 | | | | |
| Total (A) | 2.8 | 2.1 | | | | |

These ratios show that the role of FB exceeds that of SCH to a much greater extent in the North than in the South. In the South, on the other hand, the role of SCH factors occasionally exceeds that of FB. We argued in chapter 6, however, that our most appropriate method of comparison in studying possible school influences was when all groups were combined in the same framework. This was because a highly systematic relationship was noted between the teachers of white and the teachers of other students and their respective students' achievement levels (see also Mayeske et al., 1969). Moreover, this relationship could not be discerned when the racial-ethnic groups were kept separate (p. 64).

When we look at these analyses for all groups combined we can note various trends for each of the separate groups. Thus in the row labeled "Total (U)" (that is, before RETH is brought into the analysis) the role of FB exceeds that of the SCH factors to a greater extent in the North than in the South. Indeed, for females in the South the two roles are more nearly equal. When RETH is included as an aspect of FB, the role of FB still exceeds that of the SCH factors to a greater extent in the North than in the South but the magnitude of the ratios is increased. When ACHV is first adjusted for RETH, we see that the role of FB still exceeds that of SCH, especially in the North. Consequently, we are led to conclude, as we did in chapter 6, that the role of those SCH factors in ACHV that are independent of FB is greater in the South than in the North.

This does not mean that the schools in the South are better than those in the North, but only that they tend to have a greater independent role. We saw in chapter 5 that there was a more pronounced allocation of students into schools on the basis of their FB, especially their SES and RETH, in the South than in the North. Since ACHV is correlated with FB, this means that large proportions of high-achieving students tend to go to school with one another. The effect of this assignment strategy is to cause the school to adjust its performance standard in accordance with the aggregate ACHV of its students. We may conjecture that once this performance standard, or "going rate" of acceptable performance, has been established it exerts an influence on each individual student that is independent of his FB. Thus the achievement level of an individual student may flourish or falter by virtue of the achievement levels of his schoolmates. Since there is more allocation of students into schools on the basis of their FB in the South than in the North, it follows that this aggregate ACHV would also have a more pronounced effect there. We are not able to say on the basis of these data what the composition of a group should be in order for the ACHV of an individual student to be enhanced. This would require the creation of experimental groups, the composition of which could be systematically altered, and to which individuals could be assigned at the will of the experimenter. Some alternatives to this approach are discussed in the next chapter.

We may also ask about the roles played by the five variables called SO that pertain to the achievement and motivational mix of the students. What happens to these variables when they are juxtaposed with the set of five teacher attributes that we called T(5)? It will be remembered that these attributes are: racial-ethnic composition; verbal skills; view of their teaching conditions; preference for working with students of different ability levels; and salary and training levels. The ratios obtained by dividing the unique role of SO by that of T(5) are:

| | SO/T(5) | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Male | | Female | |
| Group | N | S | N | S | N | S |
| Indian American | 6.6 | 5.6 | 6.4 | 3.5 | 3.4 | 5.6 |
| Mexican-American | 5.0 | 7.0 | 3.7 | 11.0 | 8.2 | 6.7 |
| Puerto Rican | 6.7 | 5.8 | 3.9 | 3.4 | 8.2 | 10.3 |
| Negro | 4.7 | 5.0 | 3.3 | 5.0 | 9.8 | 5.0 |
| Oriental-American | 2.4 | 1.4 | 2.4 | 1.3 | 1.0 | 1.8 |
| White | 74.0 | 72.0 | 37.5 | 37.5 | 71.0 | 34.5 |
| Total (U) | 44.0 | 30.0 | 50.0 | 31.0 | 38.0 | 28.0 |
| Total (I) | 23.0 | 12.2 | ... | ... | ... | ... |

Note.—A 0 unique role was set equal to 1. Negative overlaps were halved, and half added to each unique role before taking ratios. These occurred twice and were always small.

These ratios show that the role of SO almost always exceeds that of T(5). In fact, there is only one exception: Oriental-American females in the North, for whom the roles are equal. There does not appear to be a uniform regional trend in the extent to which SO exceeds T(5). For Indians, Puerto Ricans, Oriental-Americans, and whites the ratios are greater in the North than in the South. However, when sex differences are examined some curious results arise. For each of the groups except whites, if the ratio for males is greater in the North than in the South then just the opposite prevails for females. Similarly, if the ratio for males is greater in the South than in the North then the opposite prevails for females. For whites, however, the ratios are usually greater in the North than in the South. When all groups are combined, the ratios are again larger in the North—a result that still stands when RETH is brought into the analysis. Our most salient finding, however, is that the role of SO exceeds that of T(5) for each sexually differentiated regional and racial-ethnic group, as well as when all the groups are combined.

## 8.6. SUMMARY

In this chapter we investigated a number of special topics that either resulted from earlier analyses or were of interest in their own right. The first of these topics was the role that Language in the Home (LIH) played in achievement (ACHV). Each sixth-grade student indicated whether English or some other language was spoken most of the time at home. Responses to this question were related to ACHV both before and after different background conditions had been taken into account. The relationships observed were small even before any background conditions had been accounted for. Sex differences were found to be minimal, and the small relationships between LIH and ACHV that did exist could be explained almost wholly by Socio-Economic Status (SES). We concluded that, to the extent that our index could be considered an adequate one, the fact that English was or was not spoken in a student's home had a minimal effect on his achievement level. Indeed, after SES was taken into account, the relationship of LIH with ACHV approached zero.

The next topic investigated was the nature of the linkages between ACHV and two sets of family variables: the structural, or home background, aspects of the family (as defined by SES, FSS, and RETH), and the more behavioral aspects of parent-child relationships (as defined by the set of PRCS measures). Also investigated was the relationship between ACHV and these PRCS measures when combined with the structural aspects of the family, on the one hand, and possible school influences on the other. The first set of analyses showed that, of the three variables SES, FSS, and RETH, the first two played the greatest explanatory role in each of the PRCS measures, while SES and RETH played the greatest roles in ACHV. The next set of analyses showed that the unique role of the PRCS set far outweighed the unique role of SES, FSS, or RETH. Further analyses showed that the students' plans for further schooling (EDPLN), and their outlook on life played the largest roles. When placed in context with a comprehensive range of 36 school variables, the PRCS set continued to play a very large role in ACHV. In further analyses, ACHV and the PRCS variables combined were treated as a set of outcomes that could be influenced by both the structural aspects of the family and the school. These analyses showed that the role of each of the three structural variables was increased when compared with the role that they played when ACHV was taken as the sole dependent variable. When placed in context with the school variables, both the HB and school sets played larger roles than when ACHV alone was taken as the dependent variable. However, the unique role of the structural or HB variables tended to outweigh that of the school variables by a factor of about 2 to 1.

The third topic investigated was the magnitude of the role played by Racial-Ethnic Group Membership (RETH) in ACHV both before and after different background conditions were taken into account. These analyses showed that about 24 percent of the differences among students in their ACHV was the maximum that could be associated with their RETH. However, after a variety of background conditions had been taken into account, such as the social and economic well-being of the family (SES and FSS), parental involvement in educationally related child-rearing activities (PRCS), the family's area of residence, and the achievement and motivational levels of the students one goes to school with, the maximum percentage of ACHV that could be associated with RETH was about 1 percent. Thus, almost all of the differences among students in their ACHV that could be associated with their RETH were explained by sets of variables that were primarily social in nature and origin. On the basis of these analyses it seemed difficult to assert that differences in ACHV associated with RETH arise from any inherent predispositions of one group as compared with another. It was suggested that these analyses, as well as others in this monograph, point to ways in which the equalization of racial-ethnic differences in achievement might occur.

The fourth topic was concerned with the extent to which sex differences were associated with each of the family background measures, and in particular with the role played by parental expectations (EXPTN) in the development of the Educational Plans (EDPLN) of girls as compared with boys. These analyses showed that there were negligible mean sex differences for SES, FSS, and EXPTN, but that females, as a group, had a uniformly more favorable outlook on life (ATTUD), more favorable Study Habits (HBTS), and slightly higher ACHV levels. Mexican-American and white males reported slightly higher educational aspirations (EDPLN) than did Mexican-American and white females. For the other groups, however, the reverse was true. For a combination of these seven variables, sex differences were more fully explained for whites than for the others. Analyses of sex differences in the roles played in EDPLN by HBTS, EXPTN, and ATTUD that were independent of HB and ACHV showed that EXPTN played a uniquely greater role for females than for males. Sex differences were also observed in the roles played by ATTUD and HBTS, but these differences varied by racial-ethnic group.

Finally, we dealt with regional variations in the roles of FB and SCH factors for each racial-ethnic group, by sex. These analyses were conducted only for sixth-grade students because there were not enough schools for a regional breakdown at the higher grades. In order to further conserve on the number of schools available, the only comparisons made were between North and South. These comparisons showed that: (1) for groups other than whites the dependence of ACHV on FB and SCH factors tended to be greater in the South than in the North, but whites did not show any regional differences; (2) for almost every group other than whites (with the exception of Puerto Rican females), the role of SCH factors that were independent of FB was greater in the South than in the North, whereas for whites the regional differences were minimal; (3) for all groups the confounding of FB and SCH factors was greater in the South than in the North; (4) the role of FB exceeded that of SCH factors to a greater extent in the North than in the South; (5) when RETH was included as an aspect of FB this confounding was greater in the South than in the North; (6) when considerations of RETH were first set aside, this confounding of FB and SCH factors and the independent role of SCH factors was still greater in the South than in the North; (7) for most groups the role of the achievement and motivational mix of the students, called SO, exceeded the role of a set of five teacher attributes, called T(5), to a greater extent in the North than in the South. It was conjectured that the marked allocation of students into schools on the basis of their FB and, since the two are substantially correlated, on the basis of their ACHV, sets the standards for an acceptable rate of achievement that, once established, affects the achievement rate of each student independently of his own FB. Hence a student's achievement may flourish or falter, depending upon the achievement of his fellow students.

## Chapter 9

# INTEGRATING THE SEPARATE ANALYSES

The major purpose of this study was to explore different aspects of family background in order to see which ones might be playing the greatest role in student achievement. Two major questions were posed:

1. What roles do the various aspects of an individual student's family background play in the development of his or her achievement?

2. What roles do the various aspects of the school play in his or her achievement as compared with the roles played by the various aspects of his or her family background?

These questions were explored for students in different geographic regions of the country, for students of different racial-ethnic group membership, and for students of both sexes. The data used were from the Educational Opportunities Survey, which covered about 650,000 students together with their teachers, principals, and superintendents, in some 4,000 public schools throughout the country. The grades selected for study were one, three, six, nine, and 12, and the survey sample consisted of a 5-percent sample of schools.

The data base is comprehensive in the sense that detailed factual and attitudinal information was collected on the student's home background, and on his attitude toward school, race relations, and life in general. A battery of ability and achievement tests was administered at each grade level. Information was collected from the teachers and principals concerning their training and experience, their view of the school, and other relevant matters. The final part of the teacher questionnaire consisted of a 30-item contextual vocabulary test. The principals also answered questions on the school's facilities, staff, programs, and curriculums.

### 9.1. THE EARLIER REPORTS

The same data base had already been used in the preparation of two previous reports. The first was a report presented to the Congress entitled "Equality of Education Opportunity," and more generally known as the Coleman Report (Coleman et al., 1966). This report inquired into the extent of equal educational opportunity available to various racial and ethnic minorities. The second report, "A Study of Our Nation's Schools" (Mayeske et al., 1969), focused on the school as the basic "production unit," and attempted to determine which aspects of the school's resources were most important in influencing such aggregate school outcomes as the average achievement of the students at any particular level. More detailed information on the data base can be obtained from these earlier reports, and from chapter 1 of the present report. However, a brief overview will be given here.

In this study we attempted to build on the results of the earlier reports in two ways. The first report, "Equality of Educational Opportunity" (hereafter called the Coleman Report), had shown, among other things, that family background was of great importance in achievement, and that the variations among school resources on achievement that were independent of family background had only a small effect. We therefore attempted to build upon and extend these findings by exploring different aspects of family background that we thought might be important for achievement.

As part of the groundwork for the second report, "A Study of Our Nation's Schools" (hereafter called the School Study), extensive preliminary work was done in item analysis, scaling of variables, and reduction of variables to indices. Since the same indices were used in this study, a few words about their construction may be helpful at this point.

To serve as a guide in coding (i.e., scaling) the variables, extensive item analyses were conducted. In these analyses we computed not only the percent choosing each item alternative but also their mean score on a dependent or criterion variable of interest. For example, the student questionnaire items were analyzed against an achievement composite, the teacher questionnaire items were analyzed against their scores on the contextual vocabulary test, and the principal's questionnaire items were analyzed against the principal's annual salary, number of students enrolled in his school, the school's location (rural, suburban, or urban), and the proportion of children in the school from working-class families. On the basis of these analyses the items were coded and intercorrelated, and then the intercorrelations were grouped into indices by means of factor analytic techniques (for which see appendix A). Index scores were computed next and were averaged by school for teachers and students. Magnetic tapes were then generated that contained the index scores of average teacher, student, and other school attributes, including the principal's training and the school's facilities. These tapes were used in the computation of correlations and regressions for the School Study.

Here, in order to represent different aspects of the individual student's backgrounds, we used the student indices. To represent different aspects of the school (including the characteristics of the student body), the attributes of each student's school, as they were represented on the tapes for the School Study, were appended to each student and treated as if they were another facet of his own attributes. In this way, the school attributes were incorporated into the analysis of individual students.[1]

### 9.1.1. The Student and School Variables

The seven individual student variables used extensively throughout this study are listed below, followed by the different groups of school variables. For a brief description of these variables see chapter 1; for further details, see the Technical Supplement.[2]

INDIVIDUAL STUDENT VARIABLES
- Socio-Economic Status
- Family Structure and Stability
- Expectations for Excellence
- Attitude Toward Life
- Educational Plans and Desires
- Study Habits
- Achievement

SCHOOL VARIABLES
- School Student Body Variables

For each individual student variable as listed above, there is a counterpart at the school level; viz, the mean for all students at a particular grade level.

- Teachers
  - Socio-Economic Background
  - Localism
  - College Attended
  - Experience
  - Teaching-Related Activities
  - Proportion of Females on Staff
  - Training
  - Teaching Conditions
  - Preference for Student-Ability Level
  - Vocabulary
  - Racial-Ethnic Group Membership
- Principals
  - Principal's Experience
  - Principal's College Attended
  - Principal's Training
  - Principal's Sex
  - Principal's Estimate of the School's Reputation
- Schools
  - Specialized Staff and Services
  - Tracking
  - Testing
  - Transfers
  - Remedial Programs
  - Free Milk and Lunch Programs
  - Accreditation
  - Age of Texts
  - Availability of Texts
  - Number of Pupils Per Teacher
  - Number of Students Enrolled
  - Plant and Physical Facilities
  - Instructional Facilities
  - Age of Building
  - Pupils Per Room

For most of the analyses in this study the seven individual student variables are used. In addition, a special variable was developed in order to capture differences among achievement levels of the various racial-ethnic groups (see p. 27).

In the remainder of this chapter we shall attempt to organize and synthesize the highlights from the individual chapters, which provide the basic technical support for the entire work. The major unifying thread throughout this chapter consists of the impact of the family on the child, and the manner in which other forces interact with these family influences.

## 9.2. THE FAMILY AND THE CHILD

Of the seven student indices available to us for analysis, we can classify some as being more representative of the *structural* aspects of the family, while others are more representative of its *behavioral* aspects. For example, the variable called Socio-Economic Status (SES) pertains more to the resources in the home, both physical and human (e.g., the number of books and the parents' educational level) than it does to the activities that parents engage in with their children. According to this line of reasoning, the variable called Study Habits (HBTS) pertains very much to activities that parents engage in with their children, since it contains such items as how often the child discusses his school work with his parents, how often he was read to as a child before he started school, how much time he spends on homework, how many hours a day he watches TV, etc.

By inspecting the content of these and other variables we find that each one can be classified as either a *family structure* or a *family process* variable. Accordingly, the variables called Socio-Economic Status (SES) and Family Structure and Stability (FSS) have been used to represent the structural aspects of the family. Together, these two variables make up the student's Home Background (HB). Figure 9.1 shows how the two are related to one another when the means for each group are plotted.[3] It will be seen from this figure that there is an almost perfect linear relationship[4] between a group's relative average for SES and its relative average for FSS. Thus, across groups there is a marked dependence of SES and FSS, with values for both variables ordered as follows, from highest to lowest: whites, Oriental-Americans, Mexican-Americans, Negroes, Indians, and Puerto Ricans. The two variables help characterize a child's fam-

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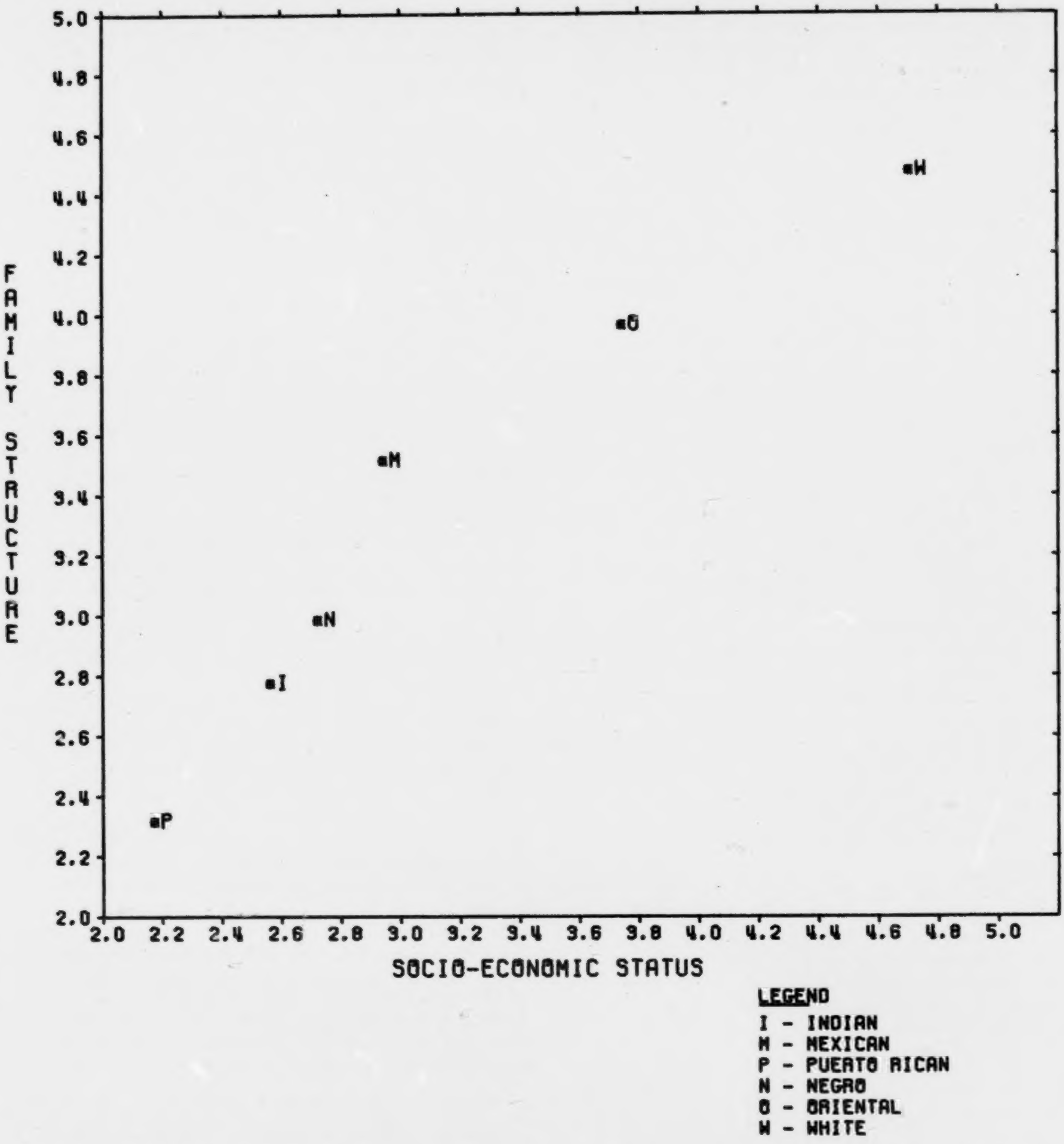
[1] The same kind of a data analysis model was employed in the Coleman Report. But this study differs from it not only in the manner in which variables were scaled and formed into indices, but also because, instead of subsamples, we used the full numbers of students and schools available for each grade level.

[2] Available from the senior author at: U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

[3] These analyses use the means for the 128,108 9th-grade students. To plot these values a point was entered where the mean values for each group intersect. For example, Puerto Ricans (PR) had a mean SES value of 2.71 and a mean FSS value of 2.97. A point was entered for the PR group where these values for SES on the axis and FSS on the ordinate intersect. These figures may differ from the Bureau of the Census figures because they are based on the questionnaire response of students actually in school at the 9th grade.

[4] The Spearman rank difference correlation is unity.

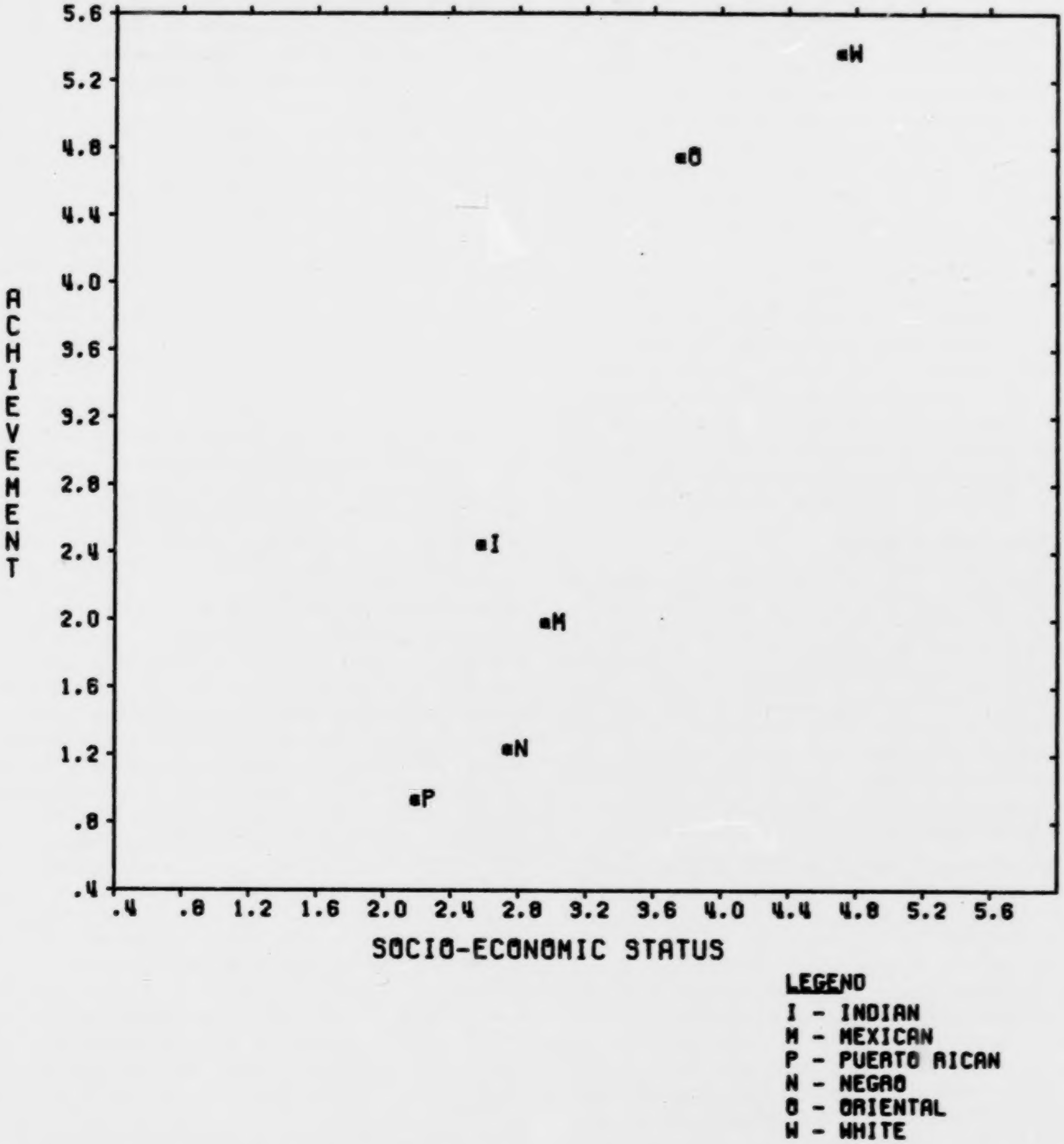
FIGURE 9.1. - RELATIVE LEVELS OF SOCIO-ECONOMIC STATUS AND FAMILY STRUCTURE AND STABILITY, FOR SIX RACIAL-ETHNIC GROUPS



ily with regard to HB. Of course, we must be sure to remember that there is considerable variation about each group mean. For example, some Mexican-American children surpass the average SES for whites, while still others fall below the average SES for Puerto Ricans.

Since it is evident from figure 9.1 that a child's membership in a racial-ethnic group is also an important part of his HB, we need a variable that will capture the differences among these groups. In order to create such a variable, we have to order the groups along some con-

FIGURE 9.2. - RELATIVE LEVELS OF SOCIO-ECONOMIC STATUS AND ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS



tinuum or according to some criterion. Obviously, different criteria might result in somewhat different orderings. Since the variable of primary interest throughout this study is Achievement (ACHV), we will use group Achievement as our criterion.

The basic procedure is illustrated in figure 9.2, which shows a plot of the group means of SES and ACHV. Again we note a strong dependence of one variable on another across groups, although the relationship is not as strong as in figure 9.1 (the Spearman rank difference correlation is .83). The ordering of the groups is not quite the same for ACHV as for SES. For ACHV the ranking of the groups is, in descending order: whites, Oriental-Americans, Indians, Mexican-Americans, Negroes, and Puerto Ricans. For SES the ranking is: whites, Oriental-Americans, Negroes, Indians, and Puerto Ricans. In order to obtain a quantitative measure that captures racial-ethnic group differences in ACHV we shall assign to each *individual* student the mean ACHV score attained by his racial-ethnic group as a whole. For example, the mean

ACHV score for Mexican-Americans is 1.95; it can be obtained from figure 9.2 by reading the scale point on the vertical axis corresponding to the "M" point. In a similar manner, the values can be obtained for the other groups as follows: Negroes, 1.20; whites, 5.33; Indians, 2.41; Oriental-Americans, 4.71; and Puerto Ricans, .90. A variable so created is said to be *criterion scaled* (Beaton, 1969). One advantage of this procedure is that the relationship of the created variable, Racial-Ethnic Group Membership, with the criterion variable, Achievement, is the maximum that can be obtained. We shall call this new variable RETH for short. (The actual sequence in which these operations were performed is described in chapter 1 and appendix A.)

We now have three structural variables that will help us characterize a child's family (analyses in chapter 4 showed that RETH behaves more like a structural than a process variable). We are now in a position to systematically study differences both within and among each of the racial-ethnic groups, particularly as to how HB relates to ACHV when placed in context with the measures that we have called process variables (PRCS). In the next section we shall summarize the relative roles played by a number of different aspects of the family in ACHV.

### 9.2.1. The Child in the Family

The organization of this section is based on a sequence of questions addressed in many of the preceding chapters. Accordingly, the results of our analyses are discussed in the following order: (1) differences among racial-ethnic groups by sex for ninth-grade students; (2) regularities in the results across regions of the country; (3) systematic differences in the results by region that are related to attributes of each region; (4) stability of the results for each racial-ethnic group, by sex, at the grade levels chosen for analysis (six, nine, and 12).[5] On occasion, other topics of special pertinence will also be summarized.

**The Dependence of Achievement on Family Background.** The main question to be asked in this section is: To what extent is ACHV associated with FB for these different groups of students? We will use as our measure of association the percent of variation in ACHV (i.e., the $R$-square) obtained from a regression analysis in which ACHV has been regressed against the FB measures. This question is important to us for two reasons. First, we want to know how much of the total variation in ACHV we are dealing with when working with these FB measures, and how much is unexplained and might therefore be attributed to other factors, either unmeasured or not yet brought into the analysis. Second, we want to know whether there are systematic differences in the level of explanation that might somehow be related to other attributes of the various groups, such as their unique cultural values or residential patterns.

To represent FB we will use the two HB measures of SES and FSS and the four PRCS measures of Expectations for Excellence; Attitude Toward Life; Educational Plans and Desires; and Study Habits.[6] A percent of variation accounted for, or $R$-square, is given for all groups combined, when RETH is included as an aspect of FB. This latter analysis explicitly incorporates differences among the groups.

Figure 9.3 presents a summary of these analyses in graphic form for each racial-ethnic group. The length of the lines represents the range of the percentages, from the highest to the lowest, across regions of the country.[7] The dot on the line represents the percentage for all students without regard to region. These percentages are largest for Orientals and whites, who have values of 38 and 27, respectively. Of the other groups, Mexican-Americans are next highest, with a value of 32 percent, followed by Negroes, Indians, and Puerto Ricans, with values of 28, 27, and 26 percent, respectively.

When all groups are put in the same framework ("Total"), the percentage jumps to 41, and when RETH is included as an aspect of FB—the line labeled "Total (I)"—this value rises as high as 47 percent. These latter two analyses show the extent to which RETH and ACHV are associated independently of the other FB measures (i.e., about 6 percent, obtained by subtracting 41 from 47). We can only speculate as to why the dependence of ACHV on FB should be greater for whites and Oriental-Americans than for the other groups. Perhaps for some groups more than others the acquisition of knowledge is more likely to lead to a "desirable" job (in terms of pay, prestige, etc.) and under these conditions family background comes to play a greater role in the promotion and sustenance of learning. Of course, this is a materialistic interpretation, and although relevant may be only part of the total picture. Other factors such as religion, political affiliation, national origin of parents and recency of their immigration, adequacy of diet, and extent of employment discrimination would also have to be considered. In short, a fully adequate test of such a hypothesis would require more comprehensive data than are currently available.

The length of the lines indicates the range in the percentages by region. This range is greatest for Puerto Ricans, Mexican-Americans, and Indians, with values of 20, 18, and 16, respectively. Oriental-Americans are next highest with a 9 percent range, followed by Negroes and whites with 6 percent each. For all students combined ("Total") the range is much smaller: only 3 percent. However, when RETH is included the range increases to 7 percent. These ranges are given merely in order to indicate that there are substantial differences in the dependence of ACHV on FB for the different regions.

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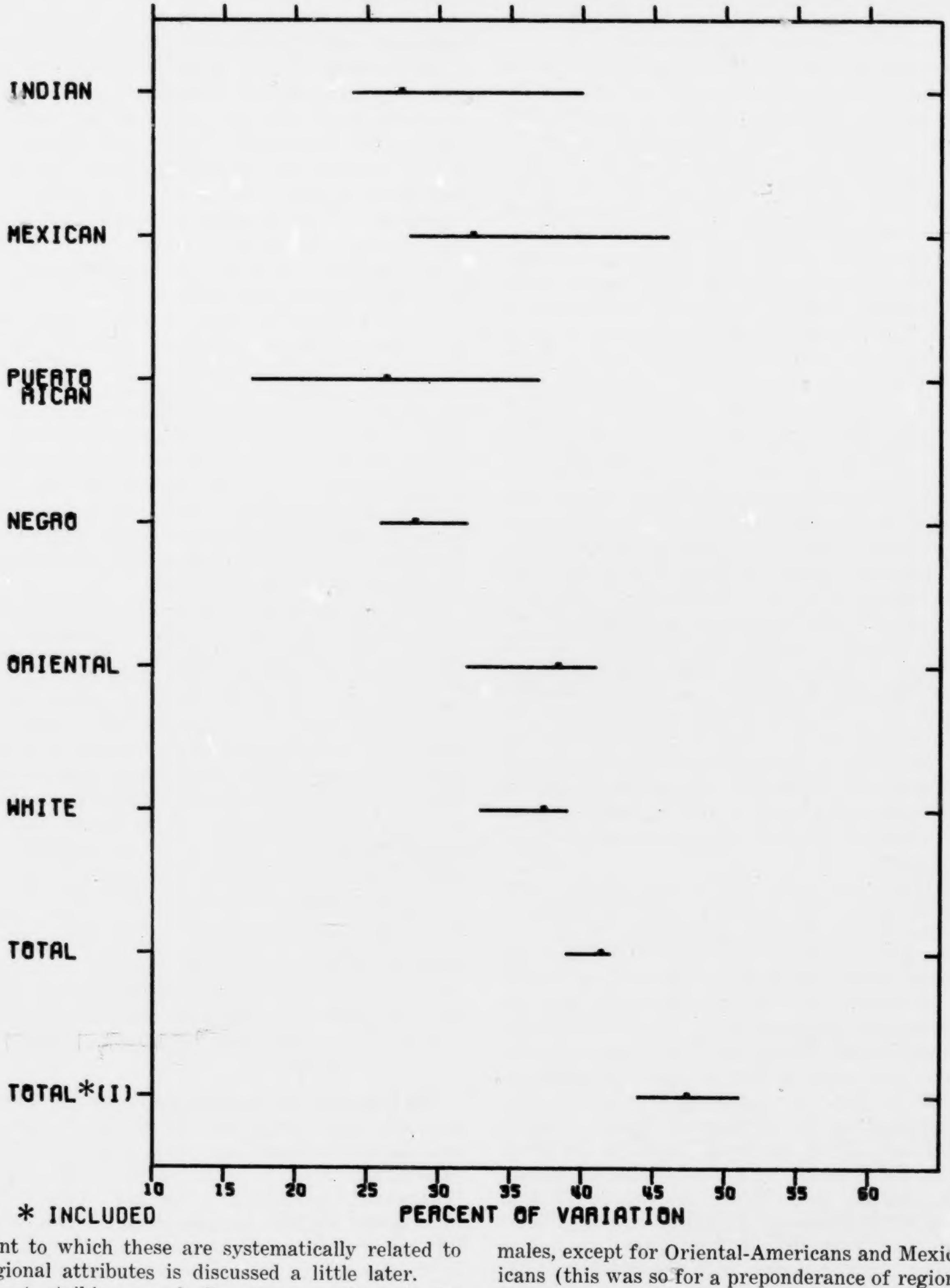
[5] Ninth-grade students were chosen the primary group for analysis because: the largest numbers of students were available; the questionnaire items were more reliably measured and the indices more comprehensively measured than at the 6th and lower grades; and the largest numbers of dropouts had not yet occurred at the 9th grade, whereas this was not so at the 12th grade.

[6] PRCS stands for Family Process; it represents the more behavioral and attitudinal aspects of the student and his family, as opposed to the structural or HB aspects.

[7] The four regions were: nonmetropolitan North; metropolitan North; metropolitan South; and nonmetropolitan South. Due to the different geographic dispersion of Oriental-Americans, a mid-Atlantic–Far Western breakdown was used for them. The States included in these regions are given in chapters 1 and 3. These analyses are based on a total of 128,108 9th-grade students.

FIGURE 9.3. - PERCENT OF VARIATION IN ACHIEVEMENT ASSOCIATED WITH FAMILY BACKGROUND MEASURES, FOR SIX RACIAL-ETHNIC GROUPS



The extent to which these are systematically related to other regional attributes is discussed a little later.

The most striking regularity across regions is for ACHV to be more dependent on FB for females than for males, except for Oriental-Americans and Mexican-Americans (this was so for a preponderance of regions, usually three out of four). The dependence is greater for males than for females. For Mexican-Americans, values for males exceed those for females in the North but not in the South. In the majority of cases this dependence is not markedly greater for one sex than the other, being roughly 2 percent for most groups. We can conclude, however, that there is a slight tendency for ACHV to be more dependent on FB for females than for males.

We also examined regional differences in the hope of finding systematic relationships between attributes of the regions and the results obtained within each region. Different trends were observed for some groups. A greater dependence of ACHV on FB was observed for Indians, Mexican-Americans, Puerto Ricans, and Negroes in the South than in the North. This was also true when all groups were combined, and even more so when RETH was included as an aspect of FB. The magnitude of these differences (viz, the percentage by which the values in the South exceeded those in the North) varied from a low of about 1 percent for Negroes to a high of about 15 percent for Mexican-Americans and Indians. For whites and Oriental-Americans, the results were very different. For the former, ACHV was more dependent upon FB in nonmetropolitan than in metropolitan areas by some 3 to 6 percent. The latter showed a greater dependence in the Far West than in the mid-Atlantic, by about 2 percent; in the Far West this dependence was greater in nonmetropolitan than in metropolitan areas, by about 6 percent. These results suggest that different kinds of considerations are appropriate for these two groups. The standard deviations for ACHV and FB indicate that there tends to be greater diversity in the South than in the North. This greater diversity may be caused by the greater density of groups other than whites (with the exception of Oriental-Americans), and by the South's more pronounced color-caste structure. For whites and Oriental-Americans, we can suggest only that the key variable is diversity, or in other words that there is a greater range of FB and ACHV in the nonmetropolitan than in the metropolitan area. In later sections we shall learn more about the kinds of FB factors that give rise to such differences.

The last point to be considered in this section is the stability in the percent of variation in ACHV explained by FB factors for the different grade levels. These percentages are given in figure 9.4, which shows that the values increase at the higher grade levels for whites and Negroes.[8] For Indians and Oriental-Americans they dip at the ninth grade to rise again at the 12th. For Mexican-Americans and Puerto Ricans there is a definite decline at the higher grade levels; this is probably related in large measure to the lower achieving students, as they drop out of school. At the sixth grade, then, the values for Negroes and whites are lowest, while at the ninth grade whites and Oriental-Americans display the largest values and maintain that relative position at the 12th grade. When all the groups are combined, with or without adjustment, there is an increase from grades six to nine but a virtual plateau from nine to 12. Examination of sex differences showed them to be more pronounced at the 12th and sixth grades than at the ninth grade. At the sixth grade the differences averaged about 3 percent while at the 12th grade they averaged about 5 percent. For both these grade levels males tended to have larger percentages than females (the exceptions are sixth-grade Oriental-Americans and 12th-grade Negroes and whites).

On the basis of these grade-level results we will have to modify somewhat the conclusions we drew using only the ninth grade. For the latter, we concluded that the percentages were slightly larger for females than for males. We shall have to qualify this by saying that sex differences depend upon grade level, being more than somewhat in favor of males at the sixth and 12th grades and somewhat in favor of females at the ninth grade. More important, we shall have to qualify our "materialistic" theory of the dependence of ACHV on FB; viz, that it is a function of the extent to which the acquisition of knowledge is seen as leading to "desirable" employment. Our theory remains plausible at the twelfth grade because whites and Oriental-Americans still lead the other groups. However, at the sixth grade the remaining groups (other than Negroes) have larger percentages than the whites. This, we reasoned, was due in part to the presence of students who drop out before reaching the ninth grade, particularly Mexican-Americans, Indians, and Puerto Ricans. Consequently, we shall have to conclude that the diversity of each group is also a factor to be considered in accounting for these differences.

In summary, differences among the racial-ethnic groups in the extent to which their ACHV is dependent upon FB appeared to be related primarily to the diversity of each group on these measures. This diversity in turn varied by grade level, being greater at the lower than at the higher grade levels for nonwhites (other than Negroes). For nonwhites (other than Oriental-Americans) the dependence appeared greater in the South than in the North. Since both a greater diversity and a more pronounced color-caste structure were present in the South, it was difficult to argue in favor of the one explanatory theme rather than the other. Sex differences in level of dependence were usually much smaller than differences among racial-ethnic groups, and could be traced in large measure to the grade level under consideration. In the next sections we shall examine the relative roles of different sets of variables with a view to determining which ones play the greatest explanatory role. These analyses may also help us to understand what may be giving rise to the diversity noted above.

**The Role of Home Background Factors in Achievement.** A child's first teachers are usually his parents, siblings, and playmates. According to such theorists as D. O. Hebb (1949) and J. McV. Hunt (1961; 1969), these early "educators" may play a critical role in the socialization of infantile abilities by providing not only stimulation for learning but actual experiences that may be utilized in the mastery of later situations. In this and the next few sections we shall further document the relationships of family background and child-rearing practices that have been noted in a number of large-scale studies (Fla-

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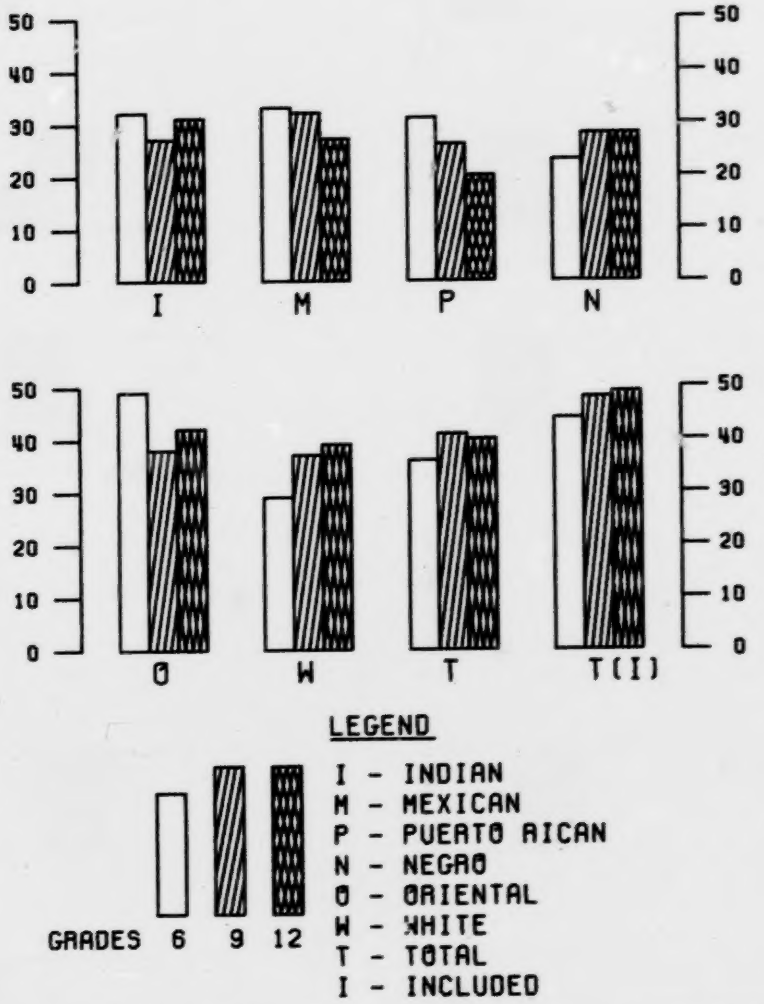
[8] These analyses are based on a total of 118,106 6th-grade and 94,096 12th-grade students.

FIGURE 9.4. - GRADE-LEVEL TRENDS IN THE PERCENT OF VARIATION IN ACHIEVEMENT ASSOCIATED WITH FAMILY BACKGROUND MEASURES, FOR SIX RACIAL-ETHNIC GROUPS



nagan, 1964; Shaycoft, 1967; Husén, 1967; Coleman et al., 1966; Plowden, 1967).

A number of investigators have focused on the structural aspects of the family, and on how differences in the family's social and economic well-being, as contrasted with the presence or absence of key family members or role models, have implications for the development of different attributes and behaviors in children (Rainwater, 1967; McClelland, 1951). Does the family's socioeconomic status or the presence or absence of key family members play a greater role in the development of achievement? Or are socioeconomic status and family structure so closely intertwined that the one cannot be separated from the other?[9] Accordingly, the first question we shall address is: What are the relative roles played by Socio-Economic Status (SES) and Family Structure and Stability (FSS) in the development of ACHV? Since family disruption usually results in absence of the father, and since this may have a greater impact on boys than girls, we shall also look closely at sex differences.

To answer this question as we have posed it requires more than the usual regression analysis. With the latter we can obtain the unique relationship of one regressor (or independent) variable with a dependent variable, after the relationship of one or more other variables with the dependent variable has been taken into account. In the context of the present question, let us say that we are interested in the relationship of FSS with ACHV that is independent of SES. This is given by:

$$(1) \quad U(FSS)=R^2(SES,FSS)-R^2(SES)$$

Where $U$ stands for the unique variance accounted for and $R^2(\ )$ the percent of variation accounted for by the variables included in the parentheses.

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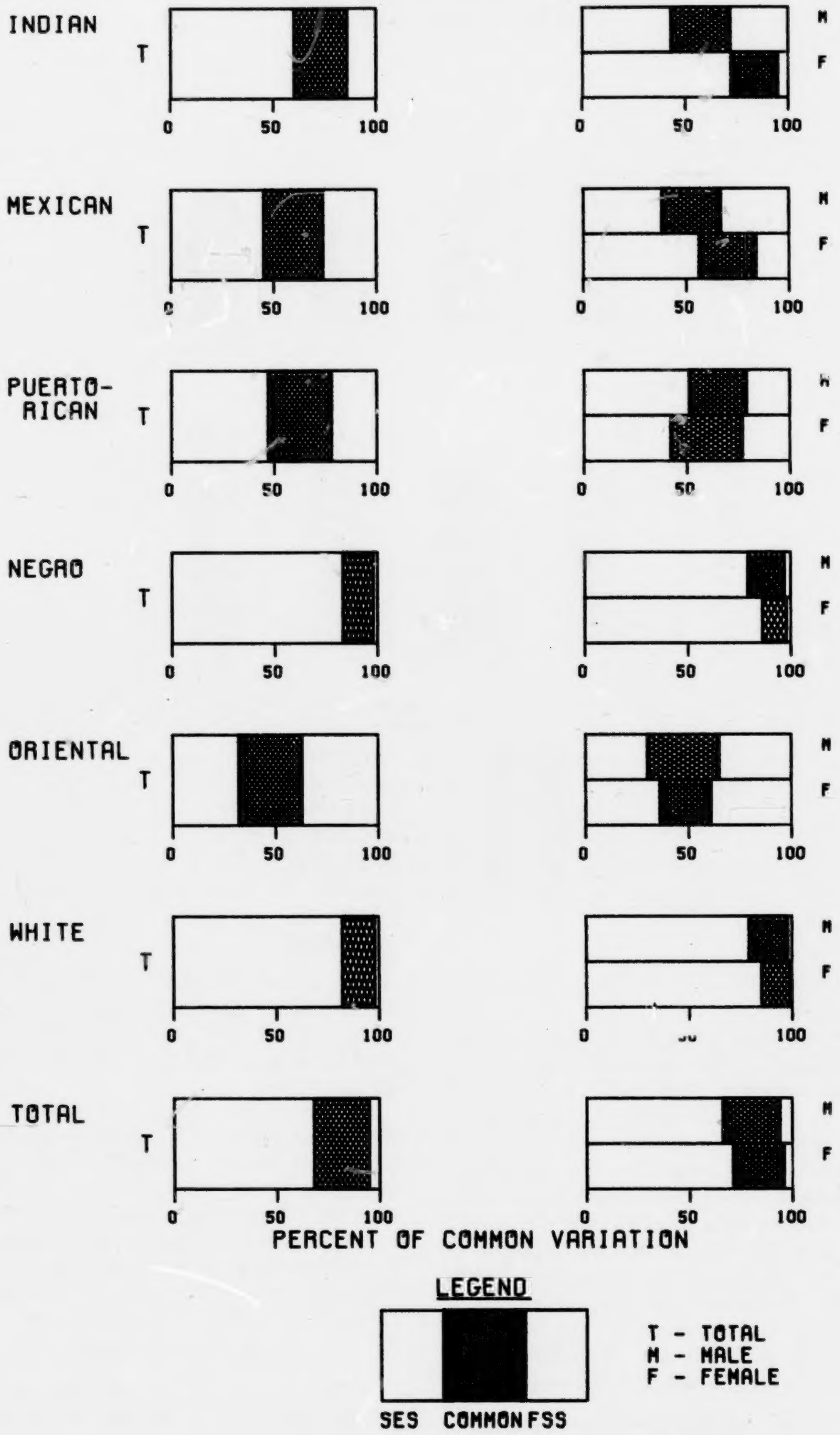
[9] We saw in figure 9.1 that they were closely intertwined across groups, but the same is not necessarily true for students.

FIGURE 9.5. - THE ROLE OF HOME BACKGROUND FACTORS IN ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS, BY SEX



Similarly, the relationship of SES with ACHV that is independent of FSS is given by:

$$(2)\quad U(SES)=R^2(SES\ FSS)-R^2(FSS)$$

These two formulae give us the unique role of each variable independent of the other variable. As we have formulated the question, however, we are interested not only in the unique relationship of each variable with ACHV but also in their common portion. The latter represents the confounding and possible interplay of SES and FSS as they relate to ACHV. A measure of this overlap or confounding is given by:

$$(3)\quad C(SES, FSS)=R^2(SES, FSS)-U(SES)-U(FSS)$$

Where C represents the measure in question.

When added together these three terms yield the squared multiple correlation for both variables, as follows:

$$(4)\quad R^2(SES, FSS)=U(SES)+C(SES, FSS)+U(FSS)$$

In other words, this is a partitioning into their two unique and common portions of the variance in the dependent variable accounted for by these two variables. This technique is called commonality analysis; an extended discussion of it is given in chapter 1 and in the Technical Supplement.

In comparing these results for different groups we are more interested in the relative values of these terms than we are in their absolute values. To obtain the relative values we convert each term in (*4*) to a percentage by dividing by $R^2(SES, FSS)$ and moving the decimal two places to the right. This operation gives an equation of the following form:

$$(5)\quad 100=(Unique\ percent\ for\ SES)+(Common\ percent)+(Unique\ percent\ for\ FSS)$$

Unless otherwise specified, results in the following sections will be given in terms of unitized commonalities, or percentages of *common* variation.

The first such analysis is given for ninth-grade students, in figure 9.5.[10] The left-hand column consists of graphs for each group total (T), while the right-hand column consists of graphs for the males (M) and females (F) of each group. The shaded portion of each graph represents the overlap or confounding of SES and FSS. Figure 9.5 shows that, for every group except Oriental-Americans, the role of SES (or unique percent) exceeds that of FSS. This is especially true of whites and Negroes. The common portions, too, are much larger for the other groups than they are for the whites and Negroes. In the right-hand column we can detect sex differences for most of the groups. As anticipated, FSS plays a larger relative role for males than females, with some notable exceptions in the case of Oriental-Americans and Puerto Ricans. These sex differences are slight for Negroes and whites, but much more pronounced for the other groups. On the basis of these results we may conclude that: (1) the unique role of SES is usually much greater than that of FSS, except for Oriental-Americans, for whom the roles are more nearly equal; (2) FSS plays a slightly greater relative role for males than for females, except for Oriental-Americans and Puerto Ricans, for whom the opposite is true; (3) the confounding or interplay of SES and FSS, as well as the unique role of FSS, is much smaller for Negroes and whites than for the other groups.

Let us reflect for a moment on these results. Why should the relationship of FSS be so small for Negroes and whites, and so similar in magnitude, when the incidence of family disruption is so different for these two groups? Daniel P. Moynihan (1968) has shown that the rate of father presence in the home is about 82 percent for whites and 55 percent for Negroes. Can it be, then, that Negroes have developed more effective ways of compensating for family disruption than have the other nonwhite groups, so that this disruption has less of an effect on their ACHV? Or can it be that other factors are at work? Thus there may be certain conditions under which FSS plays a large role for both Negroes and whites. In order to explore these and related questions we shall examine the magnitude of the role of FSS that is independent of SES for different regions of the country and different grade levels.

We might anticipate that for many of the nonwhite groups conditions of physical and social well-being, as well as opportunities for employment and advancement, will vary with the different regions of the country, and that these variations may in turn relate in some way to the importance attributed to education and the effort put forth in attaining it. When these latter conditions prevail the presence or absence of key family members may be more critical for the development of ACHV. The extent to which the role of FSS in ACHV that is independent of SES varies by region for each group is shown in figure 9.6.[11] The length of the lines in this figure indicates the extent of variation. It is obvious that Puerto Ricans have by far the greatest range (84 percent), followed by Oriental-Americans (39 percent), Indians (19 percent), and Mexican-Americans (18 percent). The range is only 8 percent for Negroes, 3 percent for whites, and 3 percent for all groups combined. Clearly, the range of variation in FSS across regions is small for these latter groups.

We have examined the extent of variation across regions. But what about the regularities and systematic differences? For each group, the role of SES exceeds that of FSS in a preponderance of the regions, often to a substantial extent.[12] When sex differences are examined, it appears that FSS plays a slightly greater role for male than for female Indians, Mexican-Americans, and whites in most of the regions.[13] For Puerto Ricans the role of FSS is greater for females than males, while the role of FSS depends upon the region for Negroes, being greater

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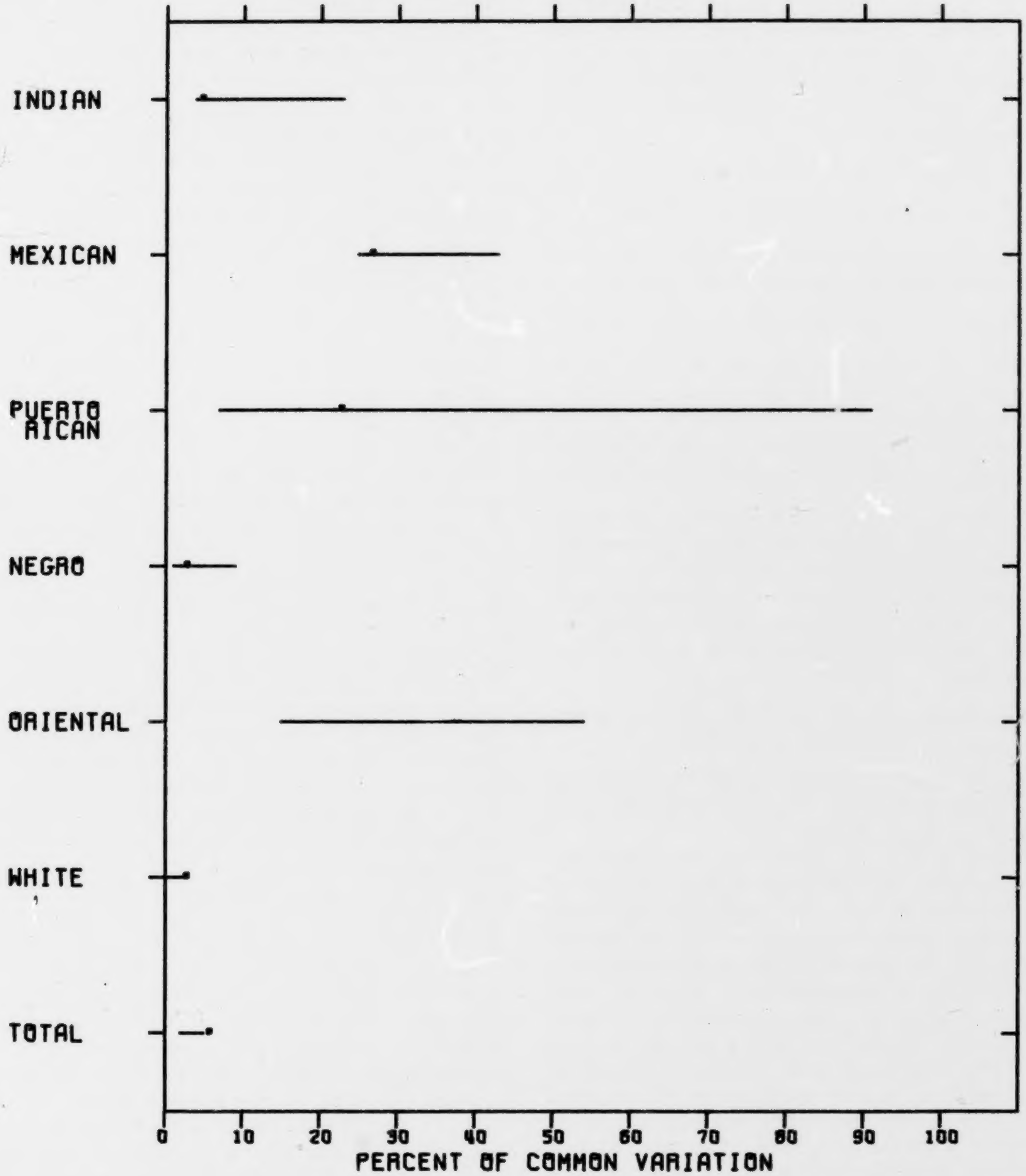
[10] See chapters 2 and 4 for further details of these analyses.

[11] These are the ranges for the percent of common variation that is associated with FSS independently of SES. The dots represent the value for the 9th-grade total taken from figure 9.5.

[12] See chapters 3 and 4 for the details of these analyses.

[13] The regions are: nonmetropolitan North; metropolitan North; nonmetropolitan South; and metropolitan South, except for Oriental-Americans, for whom a mid-Atlantic–Far West classification was used.

FIGURE 9.6. - REGIONAL VARIATIONS IN THAT PORTION OF THE ROLE OF FAMILY STRUCTURE IN ACHIEVEMENT THAT IS INDEPENDENT OF SOCIO-ECONOMIC STATUS, FOR SIX RACIAL-ETHNIC GROUPS



for males in the North and for females in the South. But what of the irregularities in the results across regions? Are they somehow related in a systematic way to differences among the regional groups? We had reasoned earlier that FSS might play a greater role in ACHV in the North than in the South because opportunities for advancement on the basis of personal competence as opposed to social group membership might be greater there. Although there was a slight trend in this direction it was so slight that we could not consider it as substantiating this line of reasoning. We are forced, therefore, to conclude that variations in FSS are not systematically related to regional differences.

We may ask next about the stability in the role of FSS for the different grade levels. These analyses, given in figure 9.7,[14] show that FSS tends to diminish in magnitude

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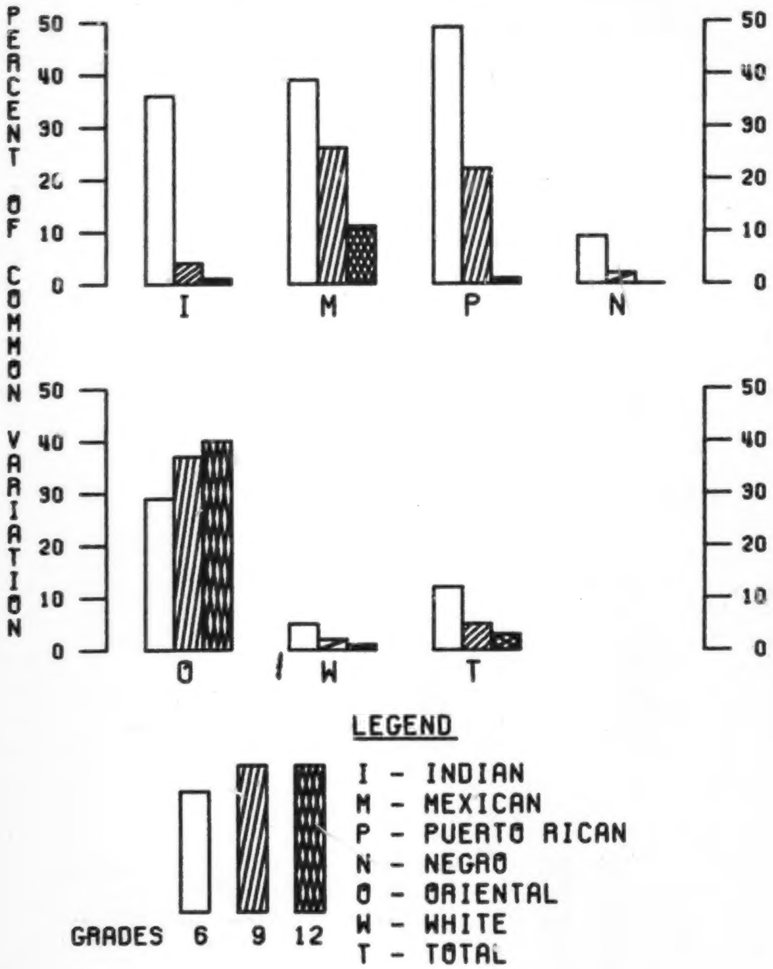
[14] See chapter 7 for more details on these analyses.

FIGURE 9.7. - GRADE-LEVEL TRENDS IN THAT PORTION OF THE ROLE OF FAMILY STRUCTURE IN ACHIEVEMENT THAT IS INDEPENDENT OF SOCIO-ECONOMIC STATUS, FOR SIX RACIAL-ETHNIC GROUPS



over the grade levels [15] except for Orientals, for whom an increasing trend is observed. Moreover, FSS tends to play a greater role for males than for females in most groups. However, for Negroes and whites the role of FSS is always small, whereas for the other groups it is often quite large. We are forced to ask, then, why it is that FSS can translate so directly into ACHV for all minority groups except Negroes, even though for Negroes and whites there is no direct relationship between these two sets of variables. Can it be that, for Negroes and whites, there are fundamentally different processes at work? Or are there other variables that intervene between the structural aspects of the family and the child's achievement? Might it be that these intervening variables or behaviors are the key ones, and that it is not so much the presence or absence of certain family members that is crucial for ACHV but rather whether or not certain activities are performed? The analyses in figure 9.8 are addressed in part to these questions for they show the link between the structural or HB aspects of the family and each of the attitudinal and behavioral measures we have called collectively Family Process (PRCS). These analyses are given for all students; those in the next section systematically cover the role of this set of variables in combination with HB for each of the separate groups.

The bar graphs in figure 9.8 represent the percent of common variation that is uniquely associated with each of the three HB variables of SES, FSS, and RETH.[16] By adding these percentages and subtracting them from 100 one can obtain the percent of common variation that is shared or confounded. Thus, for Expectations for Excellence, 32 plus 21 plus 1, or 54 percent of the common variance, is unique to SES, FSS, and RETH, respectively, while 100 minus 54, or 46 percent, is inseparably bound up in the relationship of each variable with the other.[17] These graphs show that SES and FSS each have sub-

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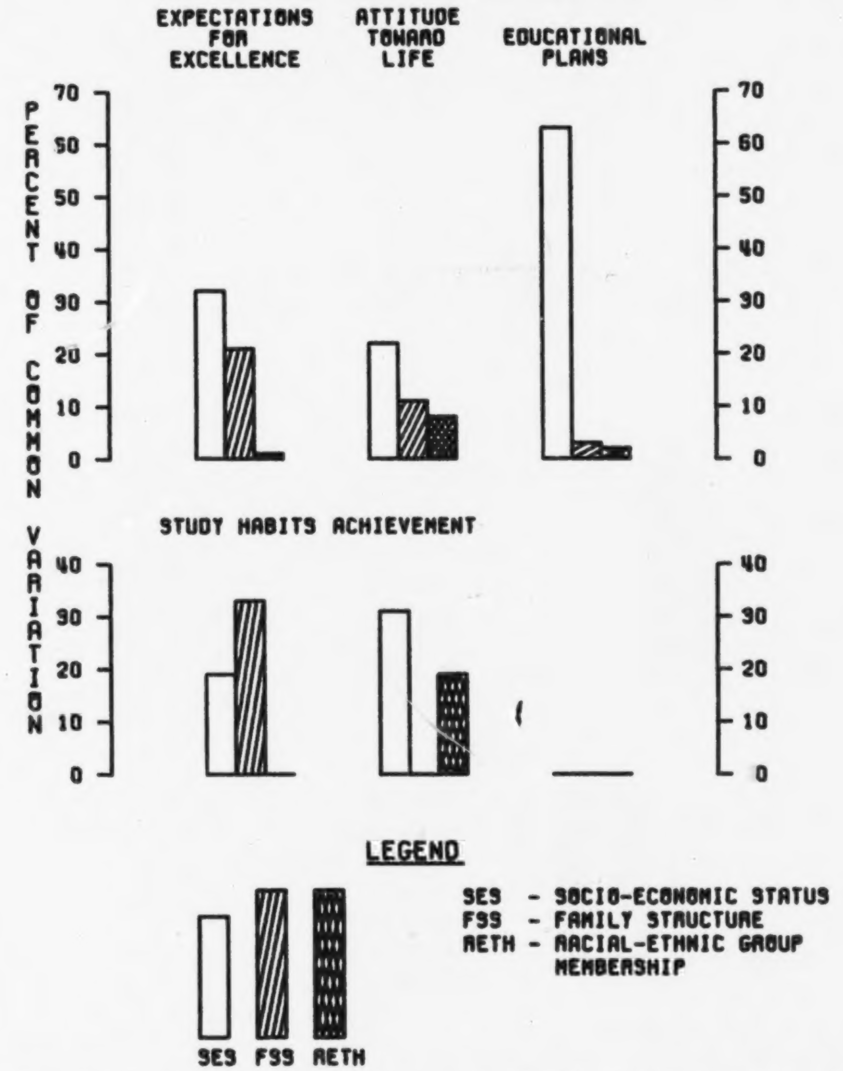
[15] Some of these changes are due to the differing nature of the samples and indices at the higher grade levels, being more select on students with regard to their school-going propensities and more comprehensive in the indices at the higher grade levels (9 and 12).

[16] See chapter 8 for details of these analyses.

[17] A discussion of commonality analysis for three sets of variables will be found in the Technical Supplement.

FIGURE 9.8. - THE ROLES OF THREE HOME BACKGROUND FACTORS IN MOTIVATION AND ACHIEVEMENT



stantial unique roles in Expectations for Excellence, Attitude Toward Life, and Study Habits.

The role of SES in EDPLN is remarkably large, and overshadows that of FSS and RETH. The roles of SES and RETH in ACHV are both substantial, while that of FSS is negligible. The only other role for RETH, although not large, is in ATTUD. We regard these values for RETH as representing, at least in part, the color-caste aspect of the social structure that is independent of class membership. Regarded as such, they indicate that ACHV and ATTUD are most sensitive to this aspect of the social structure. Our main interest at this point, however, is in the role of FSS, which is remarkably large for HBTS, moderate to low for EXPTN and ATTUD, and negligible or nonexistent for EDPLN and ACHV. The FSS set does play a substantial role in three of the four variables we have called PRCS. These variables, it will be recalled, involve both the expectations that parents hold for their children (EXPTN) and the activities they engage in with them in support of these expectations (HBTS), as well as the beliefs that the child himself has about his ability to influence his destiny and about what an education can do for him (ATTUD). We are therefore led to ask about the role of these PRCS variables in ACHV when juxtaposed with the HB variables of SES and FSS. That is, we are asking to what extent the structural aspects of the family play a role in ACHV when pitted against the behavioral aspects that we have labeled PRCS. These analyses are taken up in the next section.

**The Role of Family Background Factors in Achievement.** In this section we ask for each group: Is it the social and economic well-being of the family and the presence of certain key family members that play the key role in achievement, or is it the involvement of parents or parental surrogates in certain ways with the child? As we have operationalized this question, it involves the determination of the relative roles played by the sets of HB and PRCS variables, as previously defined. We are interested not only in the unique role of each of these sets but in their common portions as well. The reason is that the

FIGURE 9.9. - THE ROLES OF FAMILY BACKGROUND MEASURES IN ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS, BY SEX

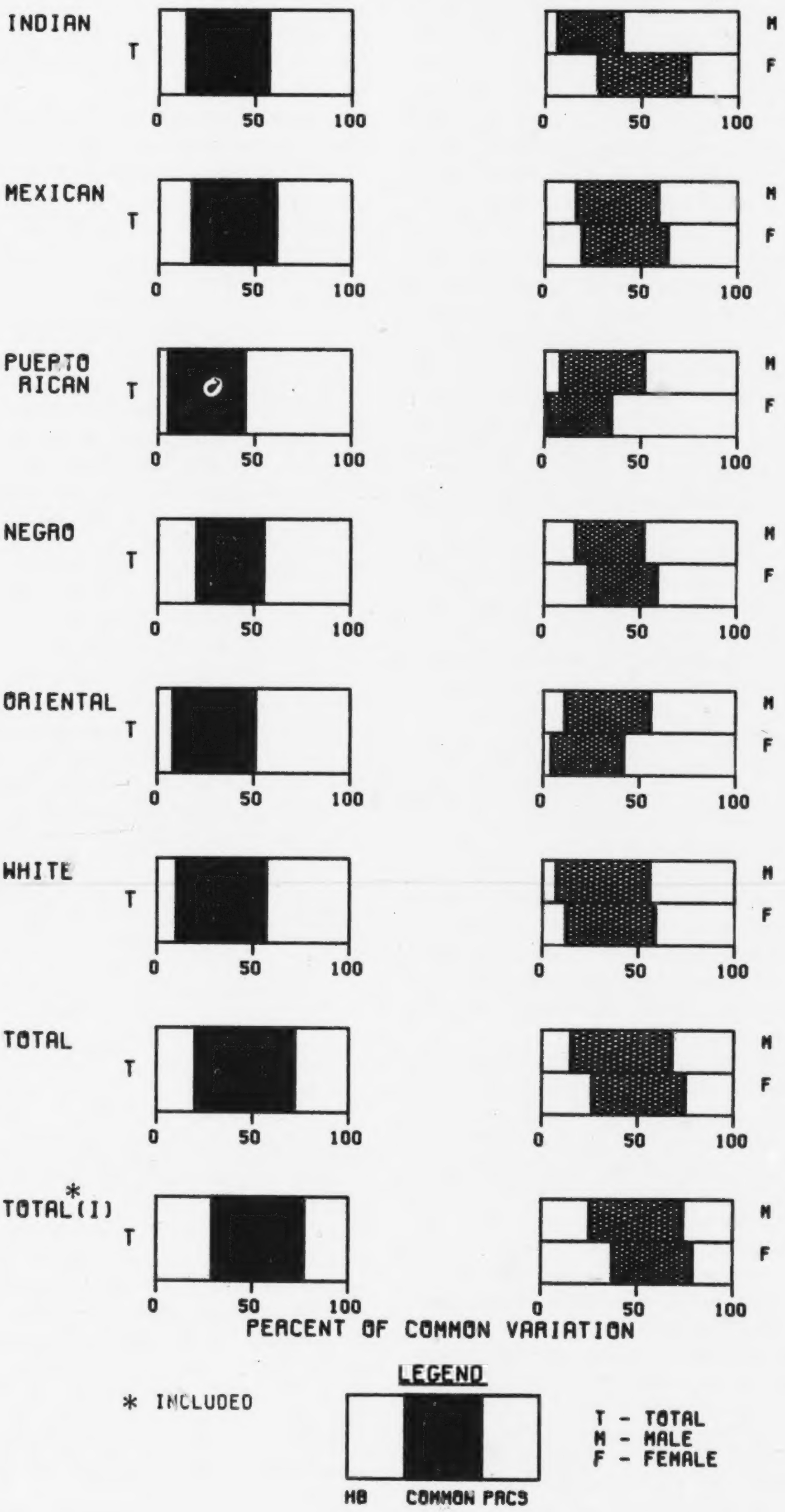


Fig. 9.9 (30a)

latter represent the extent to which high HB families also tend to engage in the kinds of activities included in the PRCS set. Indeed, if all high HB families engaged in these activities and no low HB families did so then the PRCS set would be totally confounded with the HB set. Under these conditions the unique role of each set would be zero and the common portion would be 100 percent.

The analyses in figure 9.9 show that in almost every case the unique role for PRCS exceeds that of HB, usually to a substantial degree.[18] We emphasize "almost" because the exceptions, to which we will return, are extremely illuminating. The unique role of PRCS exceeds that of HB by amounts ranging from a factor of about 2 to 1 for Mexican-Americans and Negroes to as much as 11 to 1 for Puerto Ricans. The common portions are also large: in a few cases—those of whites, Mexican-Americans, and Indians, for example—they actually equal or exceed the role of either PRCS or HB. This is evidence that the families who score high on HB tend also to be the ones who engage in the activities classed under PRCS. But they are not exclusively so, because PRCS has such a large role. Another way of stating this is that for each separate group there is a large component of parental involvement that is independent of both social class membership (SES) and family structure (FSS).

When all groups are combined, both with and without adjustment, somewhat different results emerge. It will be recalled from figure 9.1 that group differences in SES, as well as in FSS and ACHV, were quite substantial. When these differences are allowed to enter into the analysis the role of PRCS shrinks somewhat, while that of HB increases somewhat for each of the individual groups. In addition, the magnitude of the common portion increases. In fact, the magnitude of the common portion exceeds that of the sum of the unique portions for HB and PRCS. These results show that over all groups the role of PRCS still exceeds that of HB, but to a much lesser extent than for the individual groups. They also show that the confounding of HB and PRCS becomes larger than for the individual groups.

We are now in a position to examine the behavior of these percentages when the color-caste aspect of the social structure is introduced into the analysis. By this we mean that the variable we have called RETH is introduced as an aspect of HB. For this analysis the magnitude of the role for HB increases by 9 percent, while the role of PRCS and the magnitude of the common portion decrease by 5 and 4 percent, respectively. Hence, when RETH is included as an aspect of HB, the role of HB exceeds that of PRCS by about 6 percent. What these analyses suggest is that the effects of the structural aspects of the family are surmounted through educationally related child-rearing activities—but only until the color-caste aspects of the social structure are taken into consideration. Once these are considered as a structural aspect of the family the role of PRCS comes close to but does not outweigh the role of structural factors. This does not mean, however, that we should underestimate the apparent importance of PRCS. It played a major role for each of the individual groups. Indeed, for whites, for whom only class membership and not color is an issue, the role of PRCS outweighs that of HB by about 4 to 1.

Some striking sex differences are also apparent in the right-hand column of figure 9.9. The role of PRCS is usually greater for males than for females, except in the case of Puerto Ricans and Orientals. Similarly, HB is usually greater for females than males, with the same two exceptions.

We may ask next about the extent to which these results differ across regions of the country. Figure 9.10 presents line graphs that portray the extent of variation in the role of PRCS that is independent of HB (i.e., the unique role of PRCS).[19] By far the highest values are for Puerto Ricans and the lowest for Negroes and whites. In examining regularities across regions it was found that for each separate racial-ethnic group in every region the role of the PRCS set exceeded that of the HB set, often to a substantial degree. However, the extent to which it did so depended on the regional group. Examination of sex differences showed that PRCS played a greater role for males than for females in three or more of the regions for Mexican-Americans, Negroes, and whites. For Indians and Oriental-Americans the role of PRCS was greater for females than for males, while for Puerto Ricans sex differences depended on the region.

When the "Total" analyses—that is, both "T" and "T(I)"—are examined across regions, certain systematic differences arise to which we would like to give special emphasis. In order to summarize these differences we will divide the percentage role for PRCS by that for HB within each region. The ratio so formed will be greater than 1 when PRCS exceeds HB, equal when the two percentages are equal, and less than 1 when HB exceeds PRCS.[20] The approximate ratios for both of the "Total" analyses are:

| | North | | South | |
|---|---|---|---|---|
| | Nonmet | Met | Nonmet | Met |
| T . . . . . . . . . . . . . . . . | 3.5 | 2.0 | 1.1 | 1.3 |
| T(I) . . . . . . . . . . . . . . . | 2.0 | 1.0 | .6 | .6 |

These ratios show that when all groups are combined (T) the role of PRCS exceeds that of HB in all regions, and that the extent to which it does so is greater in the North than in the South. When RETH is included as an aspect of HB, however, quite different results emerge. In the nonmetropolitan North the role of PRCS still exceeds that of HB, while in the metropolitan North their roles become equal. In the South, however, the role of HB is almost twice that of PRCS. These results suggest that when the color-caste aspects of the social structure are combined with other structural aspects of the family the role of the latter in achievement is more difficult to overcome through educationally related child-rearing activi-

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[18] See chapters 3 and 4 for the details of these analyses.

[19] The dots represent the total 9th-grade values for each group, taken from figure 9.9.

[20] For these analyses see p. 33, where they are called U" and I."

FIGURE 9.10. - REGIONAL VARIATIONS IN THE ROLE OF FAMILY PROCESS MEASURES IN ACHIEVEMENT THAT ARE INDEPENDENT OF HOME BACKGROUND

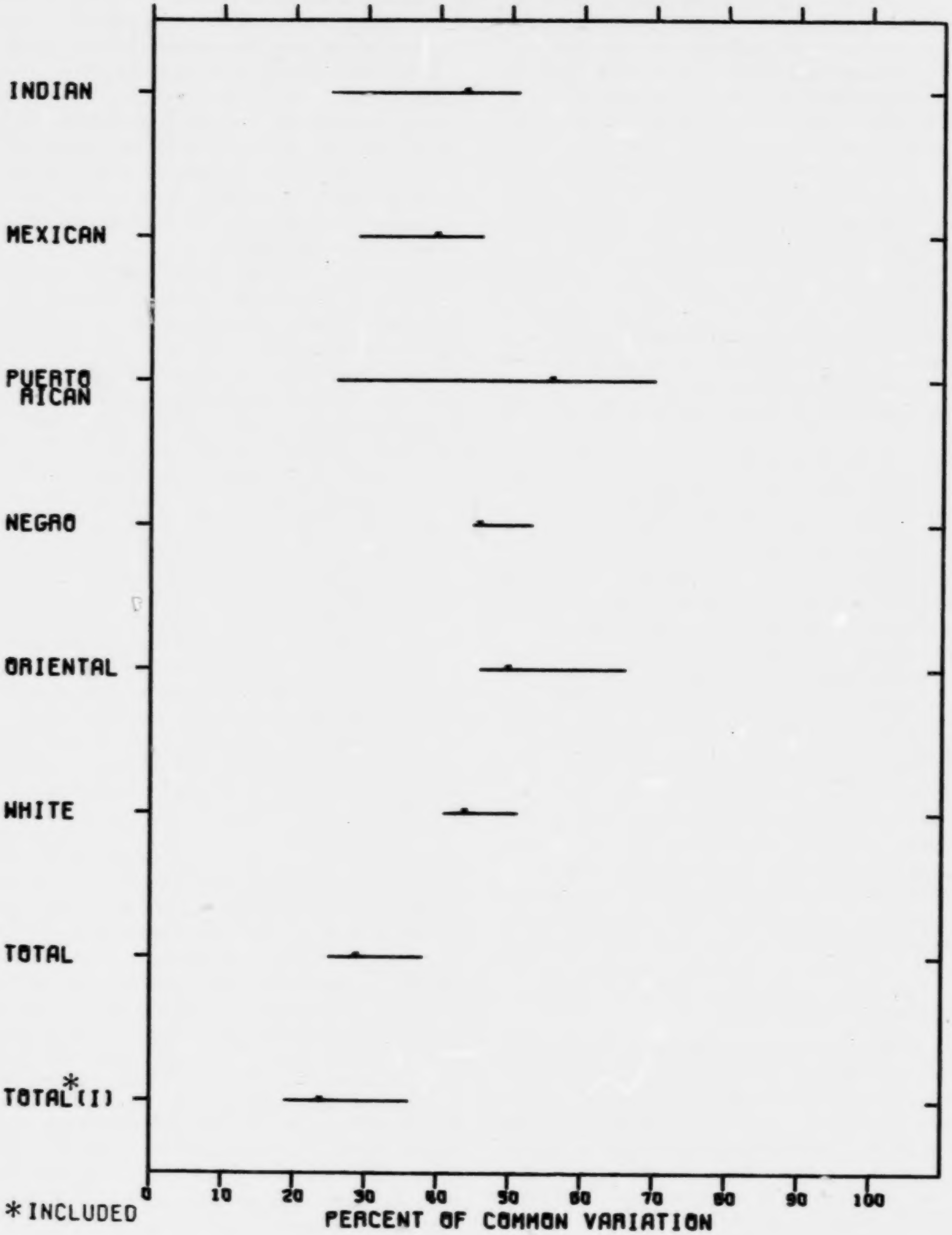

Fig. 9.10 (31a)

ties. Indeed, we might go so far as to say that these structural effects are not being overcome by these activities except in the nonmetropolitan North, where there are fewer nonwhites than in other regions, and where color-caste institutions are correspondingly less developed.

In order to examine the extent to which results at the sixth and twelfth grades compare with those from the ninth, similar ratios were formed for each racial-ethnic group, by sex.[21] These results showed that there was a tendency for PRCS to play an increasingly greater role at the higher grade levels. Exceptions were noted for Indians and Negroes, and the trend was moderated by some sex differences. There was a larger ratio for males than for females for all grade levels except in the case of Oriental-Americans and Puerto Ricans. For most groups and grade levels the role of PRCS equaled or exceeded that of HB. The most important exception was when RETH was included as an HB variable, in which case HB exceeded PRCS for females at each grade level whereas for males their relative roles were more nearly equal.

In the light of the large role played by the PRCS set our curiosity leads us to ask two related questions. The first one is: Which variables in the HB set are playing the greatest role in ACHV, and what is the nature of their confounding with variables from the PRCS set? The second question is: Which variables in the PRCS set are playing the greatest role in ACHV? This latter question is dealt with extensively in the next section.

We saw from the analyses in chapter 8 (p. 81) that when each of the three HB factors of SES, FSS, and RETH was entered into a commonality analysis with the PRCS set, the following percentages of common variance were unique to each set: SES, 5 percent; FSS, 0 percent; RETH, 14 percent; and PRCS, 23 percent. This means that the remaining 58 percent—viz, 100— (5+14+23)—was inseparably intertwined. Thus all of FSS was intertwined with the other variables, as was 90 percent of the variance in SES. Three-fourths of the variance in RETH and almost three-fourths of the variance in PRCS were also confounded. Clearly, in terms of the unique and common roles of the three HB variables, RETH and PRCS make the greatest contribution. We will ask in the next section about the roles played by different variables in the PRCS set.

**The Roles of Educational Plans and Other Motivational Measures in Achievement.** It seems only natural, given the large unique role played by the set of PRCS measures, that we should want to know which variables in the PRCS set might be playing the greatest role in ACHV. Our main interest is in how a student's plans for further schooling and aspirations for a higher ranking occupation (EDPLN) relate to his ACHV. These plans and aspirations are compared with the more immediate or shorter term kinds of motivations such as: the expectations that he and his parents have for his school performance (called Expectations for Excellence); his outlook on life as to the importance of hard work for success and how he thinks an education will benefit him (called Attitude Toward Life); and the frequency with which he engages in various intellectual activities, such as reading books, doing homework, watching television, and discussing his school with his parents (called Study Habits).

Since home background conditions may also exert an influence by virtue of the fact that affluent families are more financially able to send their children on to college, ACHV was first adjusted for differences in HB by means of partial correlation techniques. Consequently, the differences among students in their ACHV that are being analyzed are those that are independent of or at least uncorrelated with HB.

Figure 9.11 consists of bar graphs representing the percentages that result from commonality analyses of EDPLN and the other motivational measures (MTVTN).[22] It is clear from this figure that, for each group except Oriental-Americans, the role of MTVTN exceeds that of EDPLN. When all groups are combined the role of MTVTN exceeds that of EDPLN by a factor of almost 2 until adjustments are also made for RETH, after which the role of EDPLN comes to exceed that of MTVTN by a factor of almost 1.4 to 1. The common portions, too, tend to be large, which indicates a fair degree of confounding or interplay of these two sets of variables.

The most striking differences, however, are in the magnitude of the roles played by EDPLN and MTVTN by sex. For every one of the racial-ethnic groups the role of EDPLN is greater for males than for females. In addition, for all males except Negroes and Mexican-Americans, the role of EDPLN exceeds that of MTVTN. For Negro males the roles are more nearly equal, while for Mexican-American males the role of MTVTN exceeds that of EDPLN. For all females except Oriental-Americans, the role of MTVTN is substantially larger than that of EDPLN—at times nearly four times larger. For Oriental-Americans of both sexes the role of EDPLN exceeds that of MTVTN, especially for males. For all groups combined, even after adjustments have been made for RETH, the role of EDPLN is greater for males than for females, while the role of MTVTN exceeds that of EDPLN for females. Hence, for most groups, the role of EDPLN in ACHV is greater for males than for females, while that of MTVTN is greater for females than for males.

We may gain some idea of the stability in these results across regions from figure 9.12. Here, the dot indicates the ratios of the role of MTVTN divided by that of EDPLN for the ninth grade (taken from figure 9.11). The length of the line indicates the range of the ratios across regions, from lowest to highest.[23] For Puerto Ricans, Mexican-Americans, Indians, Oriental-Americans, and all groups combined, the range is quite large. For the other groups, however, the range is much smaller, particularly after adjustments have been made for RETH. All the same, for each group the role of EDPLN tends to be greater for males than for females while the role of MTVTN is greater for females than for males in a pre-

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[21] See chapter 7 for these analyses.

[22] See chapter 2 for these analyses.

[23] See chapter 3 for these analyses.

FIGURE 9.11. - THE ROLES OF EDUCATIONAL PLANS AND OTHER MOTIVATIONAL MEASURES IN ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS, BY SEX

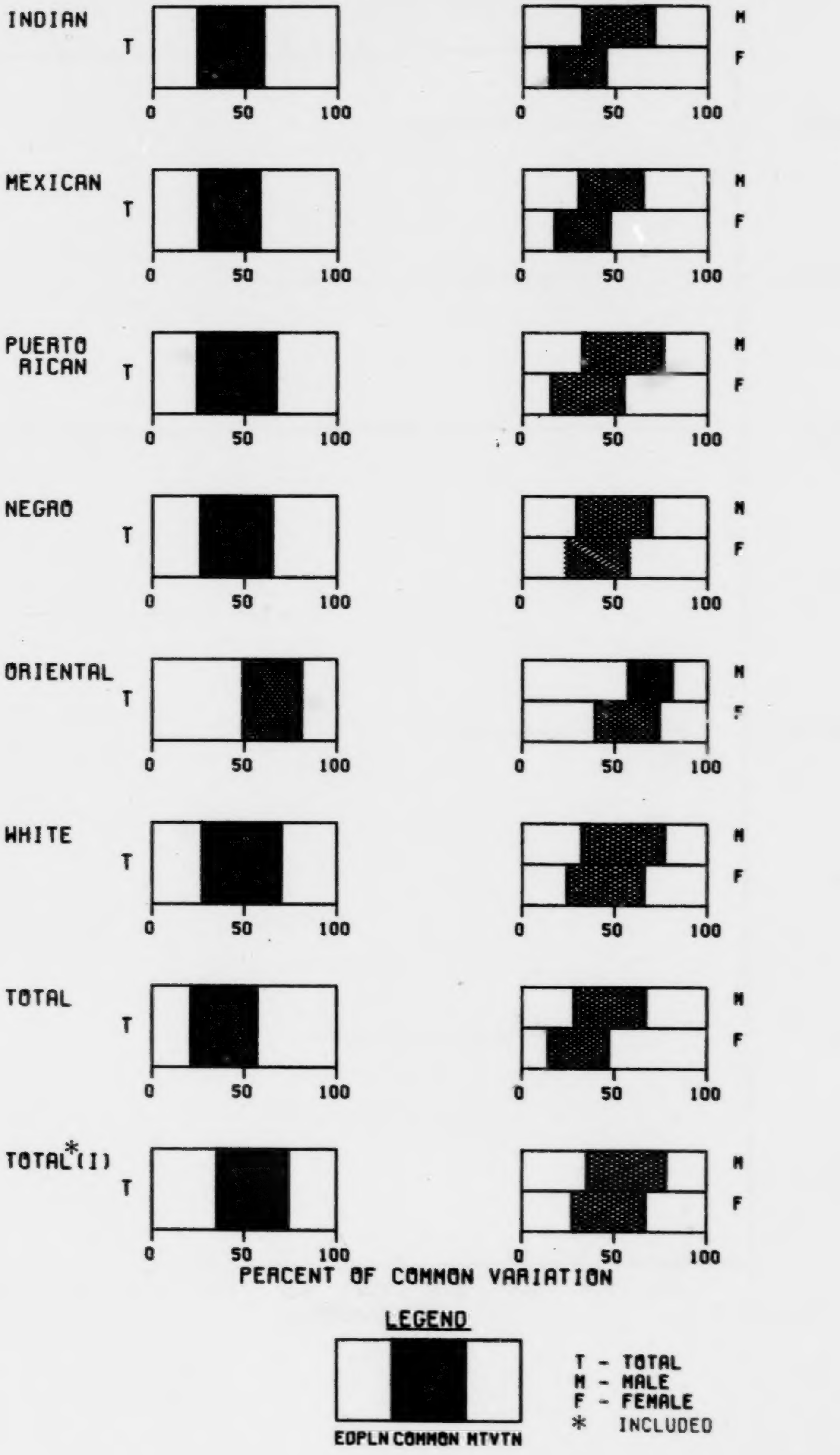

Fig. 9.11 (32a)

FIGURE 9.12 - REGIONAL VARIATIONS IN THE ROLES OF EDUCATIONAL PLANS AND OTHER MOTIVATIONAL MEASURES IN ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS

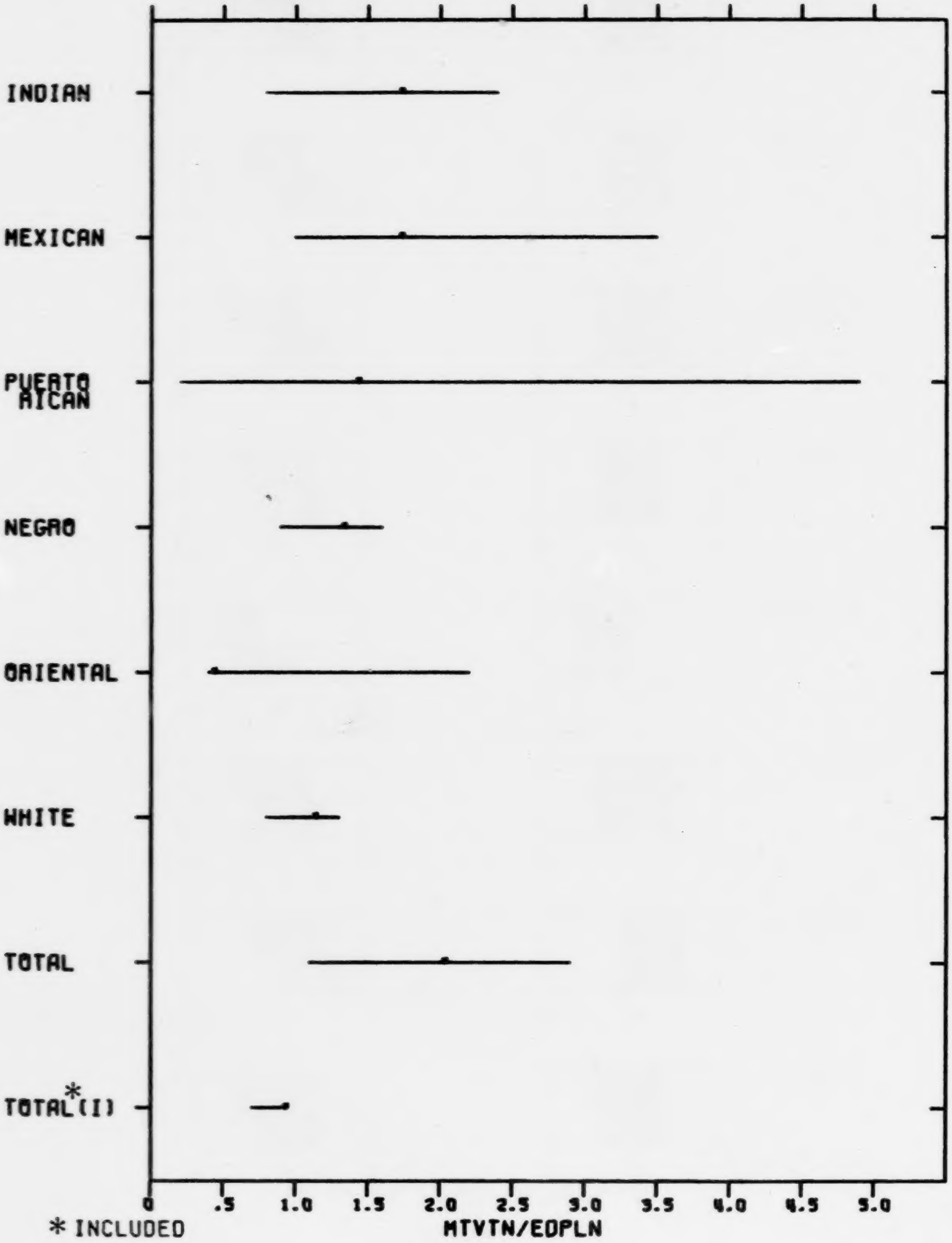

Fig. 9.12 (33a)

ponderance of the regions. Thus, the results obtained for ninth-grade students are also stable across regions.

When systematic regional differences were examined the only readily discernible trend was that, for all groups combined, the role of MTVTN exceeded that of EDPLN to a greater extent in the South than in the North.[24] However, after adjustments were made for RETH the role of EDPLN came to exceed that of MTVTN to about the same extent in all regions. These analyses suggest that differences among students in their EDPLN figure more importantly in their ACHV in the North than in the South. The fact that these regional differences are eliminated when RETH is eliminated, and that the role of MTVTN is reduced and that of EDPLN augmented, shows the dependence of MTVTN on RETH as they both relate to ACHV.

When the stability of these ratios was examined for the different grade levels some distinct differences appeared (see also p. 68). For all groups, the role of MTVTN exceeded that of EDPLN to a greater extent at the higher than at the lower grade levels.[25] But for Indians, Puerto Ricans, whites, and the total after adjustments were made for RETH, this trend increased progressively with the higher grade levels. The other groups, however, tended to peak at the ninth grade and either decline slightly or taper off at the 12th grade. For most of the groups and grade levels the role of MTVTN was greater for females than for males, while the role of EDPLN was greater for males than for females.

Since we observed that EDPLN figured differently in the ACHV of boys, we hypothesized that the factors that might play a role in the development of EDPLN could also be different for them. We thought especially that parental expectations might play an important role in the development of male EDPLN. Since both the family's financial ability to send the child on to school and their knowledge of his ACHV would also be determining factors, we first adjusted EDPLN for these differences by means of partial correlation techniques (see p. 88). Analyses were then run of Expectations for Excellence, Attitude Toward Life, and Study Habits. These analyses showed that there were, for some groups, pronounced sex differences in the extent to which each of these three variables played a role in EDPLN.

The percent of common variance uniquely associated with each is shown in figure 9.13. It will be noticed that these results are organized somewhat differently than heretofore, since the unique roles for each sexually differentiated group are juxtaposed for easier comparison. Figure 9.13 shows that for each racial-ethnic group the unique role of EXPTN in EDPLN is greater for females than for males. These differences are more pronounced for Indians, Mexican-Americans, Puerto Ricans, and Negroes than they are for Oriental-Americans and whites. Thus it is more likely to be true of females than males that the greater the parental expectations for the child's school performance, the more likely the child is to have high educational and occupational aspirations. This is so independently of the family's affluence and the child's own achievement.

For the other variables the sex differences are not as consistent nor as pronounced. A slightly greater role is played by Attitude Toward Life for female than for male Puerto Ricans, Negroes, and whites, and a greater role for male than female Oriental- and Mexican-Americans. A larger role is played by Study Habits for female than for male Indians, Oriental-Americans, and whites, and for males in all the other groups.

We have now shown that the ACHV levels of the various racial-ethnic and sexually differentiated groups may be the product of a somewhat different set of relationships of the independent or regressor variables with each other and with ACHV. In the next section we will examine the extent of differences in average ACHV for these groups.

**Group Differences in Average Achievement.** Previous analyses have shown that different processes and relationships underlie the differences in ACHV displayed by the various racial-ethnic groups for both sexes. Here, we shall inquire as to the extent of these differences, and the kinds of factors that may help to explain them. Our first question is: What is the relative magnitude of group differences in ACHV across grade levels? In other words, are the relative standings of the groups fairly stable throughout the years of schooling, or do they change? If they do, what might account for these changes?

Figure 9.14 presents grade-level trends in average ACHV for each group. The entries in this figure are expressed in terms of a total mean of 50 and a standard deviation of 10, for grades first, third, sixth, ninth, and 12th.[26] Figure 9.14 shows that the relative standing of these groups is moderately stable throughout the years of schooling.[27] Many of the shifts that do occur might be attributed to the small sample sizes for some of the groups, to errors in racial-ethnic group identification in the early years,[28] and to the differential dropout rate in the later years rather than to the differential effects of schooling. At the first grade, whites start out at roughly two to three-tenths of a standard deviation above average and remain at about that level throughout the years of schooling. Oriental-Americans start out on a near equal footing with whites, but drop slightly in the later years, to approach the total mean of 50. Most of the time, how-

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[24] See chapter 4.

[25] Some of these differences are due to the different composition of the students and indices at the higher grades (viz, 9 and 12 compared with 6).

[26] As noted in chapter 1, the achievement composite (ACHV) is increasingly more comprehensive at the higher grade levels; it reflects in part the nature of the educational process, whereby basic skills are established and further knowledge is attained through them.

[27] See chapters 2 and 3 for the 9th-grade analyses.

[28] There are more racial-ethnic classification errors at the 1st and 3d grades, since the teacher had to provide the identifying information, and sometimes either could not or did not elect to do so. Also, at the 1st grade fewer students were sampled than at the other grade levels. The group totals for the 1st and 3d grades, respectively, are: Indians, 1,547 and 4,159; Mexican-Americans, 1,630 and 7,439; Puerto Ricans 1,122 and 4,986; Negroes, 26,940 and 37,606; Oriental-Americans, 379 and 830; whites, 39,818 and 69,386. See table 7.2 for the numbers of students at the other grade levels.

FIGURE 9.13 - THE UNIQUE ROLES OF MOTIVATIONAL FACTORS IN EDUCATIONAL PLANS THAT ARE INDEPENDENT OF HOME BACKGROUND AND ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS, BY SEX

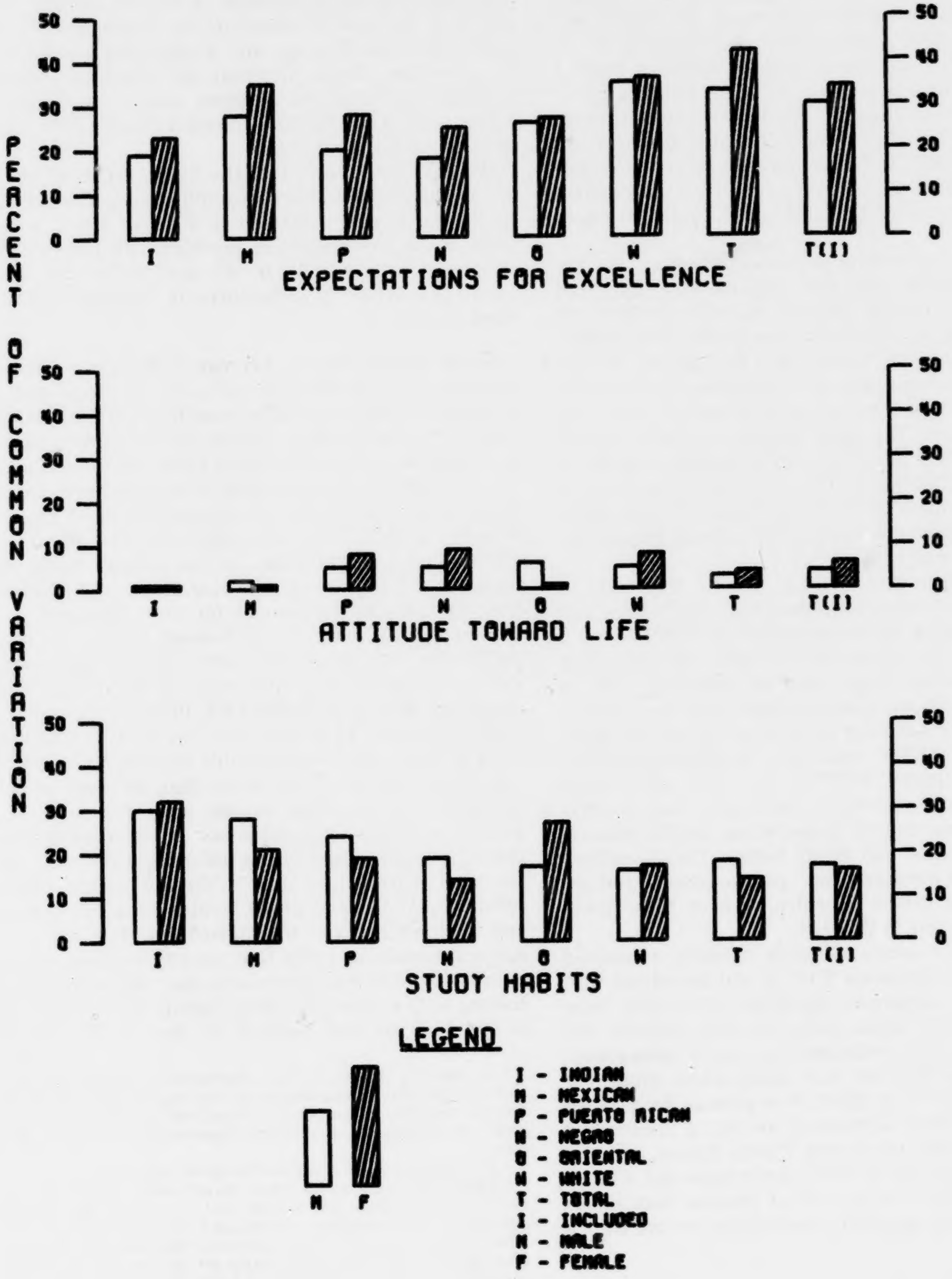

Fig. 9.13 (34a)

FIGURE 9.14 - GRADE-LEVEL TRENDS IN AVERAGE ACHIEVEMENT, FOR SIX RACIAL-ETHNIC GROUPS

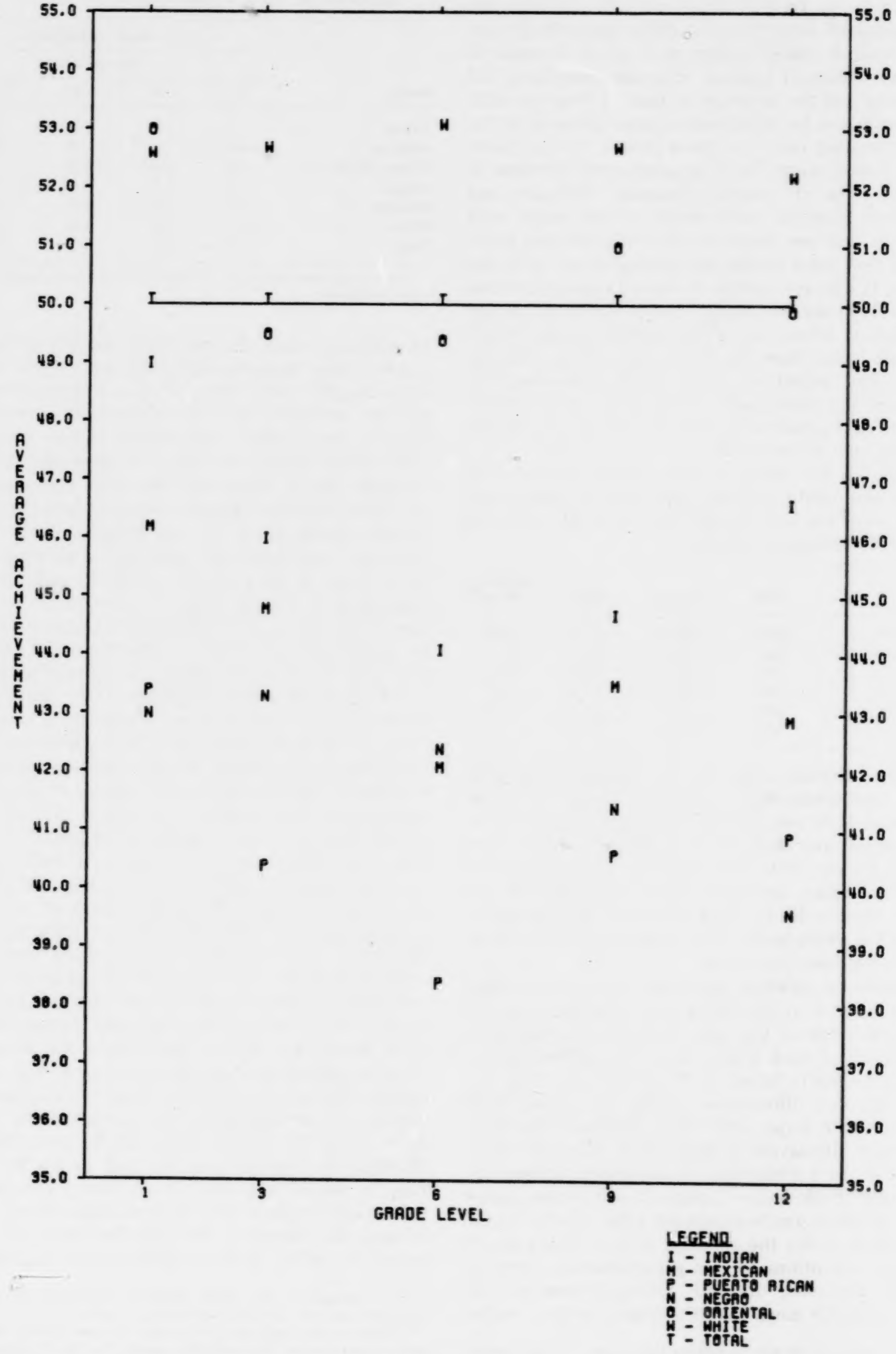

Fig. 9.14 (35a)

ever, they are near or above average. The other groups trail the whites by roughly four-tenths to one and one-half of a standard deviation, depending upon the groups and grade level. As noted earlier, most of the increase in the relative standing of Indians, Mexican-Americans, and Puerto Ricans and the decrease in that of Negroes after the sixth grade can be explained in large measure by the differential dropout rates for these groups. It was shown in chapter 7 that there was a proportionate decrease in the representation of Indians, Mexican-Americans, and Puerto Ricans from the sixth grade on. The main point to be made is that one *should not* infer from these grade level trends that some groups are getting better or worse than others. If a larger sample of minority group children were available in the first grade, and if the dropouts had been retained in school, all of these other groups might appear much lower than they do in figure 9.14. Alternatively, the results might not change much from what they already are at the sixth grade, where errors in identification are less of a problem than at the earlier grades and dropouts have not yet occurred.

By computing the mean of each group across grade levels[29] we can obtain a grade level average that, when juxtaposed with the highest and lowest values, indicates the range of variation, as follows.

| | Low | Average | High | High-Low Range |
|---|---|---|---|---|
| Indian American | 44.0 | 45.9 | 48.9 | 4.9 |
| Mexican-American | 42.0 | 43.8 | 46.1 | 4.1 |
| Puerto Rican | 38.3 | 40.6 | 43.3 | 5.0 |
| Negro | 39.3 | 41.8 | 43.2 | 3.7 |
| Oriental-American | 49.3 | 50.5 | 52.9 | 3.6 |
| White | 52.1 | 52.6 | 53.0 | .9 |

These values indicate that, on the average, Oriental-Americans trail whites by 2.1 points, or about two-tenths of a standard deviation. For the other groups the corresponding values are: Indians, 6.7; Mexican-Americans, 8.8; Puerto Ricans, 12.0; and Negroes, 10.8. Hence, the groups whose values deviate farthest from those of the whites are Puerto Ricans and Negroes. The range of values over the grade levels is greatest for Puerto Ricans and Indians and least for whites.

How similar or different are these grade-level trends when differentiated by sex? One way of answering this question is to subtract the male from the female mean for each group at each grade level. The differences so obtained are shown in table 9.1. It will be seen from this table that the sex differences among the racial-ethnic groups are seldom large, and rarely approach the magnitude of those displayed in figure 9.14. However, there does appear to be a systematic relationship between sex differences and grade levels: females tend to score higher than males at every grade except the 12th, where (as the negative values show) the opposite is true. There are of course a few exceptions to this generalization. Over all grade levels, including the 12th, Oriental-American females have a higher mean than Oriental-American males. In addition, there are two slight exceptions for the first grade, where Mexican-American and Puerto Rican males score slightly higher than females of each group. Over all groups, however, we will be inclined to conclude that females score higher than males all the way up to the 12th grade, when the trend is reversed. Some of this reversal may be due to the loss, at the higher grade levels, of female students who are not necessarily low achievers. Rather, many enter the marketplace early because of economic pressures. Or marriage and pregnancy may cause them to drop out of school. In any case, this improvement in the showing for males may be due to the loss of the lower achieving dropouts, male or female, and the persistence in school and perhaps added effort of those who plan to go on to college or postsecondary training.

**Table 9.1.—Sex Differences in Grade-Level Trends in Average Achievement, for Six Racial-Ethnic Groups**

| | Mean Differences | | | | |
|---|---|---|---|---|---|
| | Grade Levels | | | | |
| Group | 1 | 3 | 6 | 9 | 12 |
| Indian | .7 | .7 | 2.6 | .2 | −4.0 |
| Mexican | −.6 | .1 | .9 | .8 | −1.4 |
| Puerto Rican | −.3 | 1.3 | 1.8 | .7 | −.9 |
| Negro | .9 | 1.1 | 1.0 | .3 | −.5 |
| Oriental | 2.6 | 3.9 | 2.9 | .6 | 1.0 |
| White | 1.0 | 1.2 | 1.2 | .9 | −.5 |
| Total | 1.0 | 1.2 | 1.3 | .8 | −1.2 |

NOTE.—The mean differences are obtained by subtracting means for males from those for females.

We have departed somewhat from the sequence we pursued in earlier sections, where we discussed grade-level trends last rather than first. However, this does seem the point at which to ask about the regularities and systematic differences across regions.[30] Three kinds of comparison were made: (1) the maximum difference across regions for each racial-ethnic group; (2) the maximum sex difference that occurred in each region, with the consistency of sex differences across regions; and (3) the extent to which the ACHV level of each nonwhite group trailed its white counterpart within each region. We found that the smallest gap across regions, on the order of 3 points or 3 tenths of a standard deviation, was for Mexican-Americans. The next smallest gaps were for whites, on the order of 4 points, and Indians, on the order of 5 points. The largest gaps were for Puerto Ricans, Oriental-Americans, and Negroes, each with values of 6 points. The extent to which some of these groups differ across regions approaches the magnitude by which they differ from the whites. This can be best illustrated by dividing the regional gap for each group by the magnitude by which they trail the whites.[31] The approximate values are: Indians, .74; Mexican-Americans, .33; Puerto Ricans, .50; Negroes, .54; and Orientals, 3.0. Thus, the extent to which Indians differ across regions is about three-fourths of the extent to which they differ from whites. For Mexican-Americans this value is one-third, for Puerto Ricans and Negroes about one-half, and for Oriental-Americans about 3. Analyses designed to determine the extent to which region of residence may play a role in ACHV independently of FB are discussed below (p. 118).

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[29] These are obtained merely by adding the means for each grade level and dividing by the number of grade levels (i.e., 5).

[30] See chapter 3 for these analyses, especially table 3.5. These analyses pertain to 9th-grade students only.

[31] That is, the Regional Difference for each group divided by the white mean minus the nonwhite mean, for the 9th grade. The 9th-grade white and nonwhite means are taken from figure 9.15.

In a preponderance of regions females had consistently higher mean scores than did males in all groups except Indians and Negroes. For these latter groups, the sex differences depended upon region. The largest sex difference within any one region was for Puerto Ricans, and the next highest for Oriental-Americans, followed by Mexican-Americans and Indians. The sex differences were smallest for Negroes and whites. These results taken together with the results from figure 9.14 and table 9.1 suggest that differences among racial-ethnic groups in their ACHV tend to be greater than the corresponding sex differences within each group. This can best be illustrated by comparing an average of the values in table 9.1 with an average of the racial-ethnic group differences, both taken without regard to sign. These values are 1.2 for an average sex difference and 5.9 for an average racial-ethnic group difference.[32] Thus the differences among the racial-ethnic groups are almost 5 times greater than are the sex differences within the groups.

We also computed, for each region, the extent to which the ACHV level of each nonwhite group trailed that of the whites. The results failed to exhibit any systematic trend. For example, Indians and Mexican-Americans trailed whites by about 1 point more in the North than in the South, while Puerto Ricans and Negroes trailed whites by about 1 to 4 points more in the South than in the North.

The last analyses to be summarized in this section concern the extent to which Area of Residence (A) plays a role in ACHV independently of FB. The role turns out to be negligible except for Negroes and Puerto Ricans, whose living conditions do indeed seem to make a difference in their ACHV.[33] The analyses summarized in the preceding paragraph suggest that these two groups fare less well in the South than in the North—a result already confirmed in chapter 3.

At this point it seems appropriate for us to undertake a brief overview of the results so far before moving on to considerations of family background and school factors in ACHV.

### 9.2.2. Summary

So far we have dealt with the roles played in ACHV by various aspects of the student's Family Background (FB). Our findings can be summarized as follows:

1. ACHV was shown to be more dependent on or at least more highly associated with FB for whites and Oriental-Americans than the other groups at the higher grade levels (ninth and 12th), but not at the lower grade levels (sixth). To be more specific:

(*a*) When all groups were combined, and Racial-Ethnic Group Membership was considered as an aspect of FB, as much as half of the total differences among students in their ACHV could be explained by FB.

(*b*) ACHV was shown to be more dependent upon FB in nonmetropolitan than in metropolitan areas for whites; in the Far West rather than the mid-Atlantic for Orientals; and in the South rather than the North for the other groups and for all groups combined (both before and after RETH was considered as an aspect of FB).

(*c*) Sex differences were seldom large, but the extent to which one sexually differentiated group exceeded the other depended upon the racial-ethnic group and grade level under consideration.

2. The unique role of SES in ACHV was usually much greater than that of FSS for all groups except Oriental-Americans, for whom their relative roles were nearly equal.

(*a*) FSS played a slightly greater role for males than for females except for Oriental-Americans and Puerto Ricans, for whom the opposite was true.

(*b*) The confounding or interplay of SES and FSS as well as the unique role of FSS in ACHV were much smaller for Negroes and whites than for the other groups.

(*c*) The extent to which the role of FSS in ACHV that was independent of SES varied across regions of the country was small for whites and Negroes but relatively large for the other groups.

(*d*) The role of FSS in ACHV that was independent of SES was small at the sixth grade for Negroes and whites, but large for the other groups. However, for all groups except Orientals, the magnitude of the role for FSS diminished at the higher grade levels.

(*e*) FSS was shown to have a relatively large role, independently of SES and RETH, in three motivational variables that could be considered as intervening between the structural aspects of the family and ACHV. These variables were: Expectations for Excellence, Attitude Toward Life, and Study Habits. The other motivational variable, Educational Plans, was shown to be more dependent upon SES than FSS or RETH.

(*f*) The small relationship between English as opposed to some other language spoken in the home and ACHV could be explained almost wholly by SES, for all groups.

3. For each separate racial-ethnic group the unique role of PRCS exceeded that of HB. However, when RETH was introduced as an aspect of HB, the roles of PRCS and HB factors were more nearly equal.

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[32] The first value is computed merely by averaging the six group values in table 9.1 for all grade levels, without regard to sign. The second value is computed by averaging, without regard to sign, each of the pair-wise differences among the six group means (viz, a total of 15 mean differences). The means used were those for the grade-level averages on the preceding pages, computed from figure 9.15.

[33] See chapter 7.

(*a*) The common portions, which represent a confounding and possible interplay of HB and PRCS, were always large, but especially when all groups were combined.

(*b*) PRCS factors had a greater unique role at all grade levels for males than for females, except in the case of Puerto Ricans and Oriental-Americans, for whom the reverse was true.

(*c*) For each separate racial-ethnic group in each region the role of PRCS factors exceeded that of HB factors; sex differences, however, were not consistently in the direction of PRCS having a larger role for males than for females.

(*d*) When all groups were combined the role of PRCS factors exceeded those of HB to a much greater extent in the North than in the South. However, when RETH was included as an aspect of HB the role of PRCS factors still exceeded that of HB in the nonmetropolitan North. In the metropolitan North the roles of the two sets were more nearly equal, whereas in the South the role of HB came to exceed that of PRCS.

4. Of the four PRCS factors that were related to ACHV after adjustment for differences in HB, the set of three factors called MTVTN played a greater role than did EDPLN.

(*a*) However, when sex differences were examined it was found that, for most groups, regions and grade levels, the role of EDPLN was greater for males than for females, while the role of MTVTN was greater for females than for males.

(*b*) It was also found that when all groups were combined the role of MTVTN exceeded that of EDPLN to a greater extent in the South than in the North, but that when RETH was included as an aspect of HB these regional differences tended to disappear, and the role of EDPLN came to exceed that of MTVTN to the same extent in all regions.

(*c*) For all grade levels the role of MTVTN tended to exceed that of EDPLN to a greater extent at the higher than at the lower grade levels.

(*d*) It was shown that, for females more than males, the higher the Expectations for Excellence relative to Attitude Toward Life and Study Habits, the more likely is the child to have high EDPLN, independently of his HB and ACHV.

5. The ACHV level of each racial-ethnic group is moderately stable throughout the years of schooling. Whites score highest, followed by the other groups in this order: Oriental-Americans, by about two-tenths of a standard deviation; Indians, by seven-tenths; Mexican-Americans, by nine-tenths; Negroes by about one and one-tenth; and Puerto Ricans by almost one and two-tenths.

(*a*) Females tended to score higher at every grade level except the 12th where males (except for Oriental-Americans) took the lead. However, the sex differences were seldom large.

(*b*) Mexican-Americans differed least across regions, while Oriental-Americans, Puerto Ricans, and Negroes differed most.

(*c*) The extent to which Indians differed across regions was about three-quarters of the magnitude by which they differed from whites, while for Mexican-Americans the corresponding value was one-third. However, Oriental-Americans were three times as variable across regions as they were different from whites.

(*d*) Females (except for Indians) tended to have higher scores in more regions than did males, with the largest sex differences in any one region being four-tenths of a standard deviation for Puerto Ricans, and the lowest values one-tenth of a standard deviation for Negroes and whites.

(*e*) The magnitude of the differences among the racial-ethnic groups in their ACHV was almost five times greater than the sex differences within the groups.

(*f*) The role of Area of Residence in ACHV that was independent of FB was sufficiently large for Negroes and Puerto Ricans for us to conclude that the different conditions under which they live in different parts of the country make a difference in their ACHV. This was not concluded for the other groups.

## 9.3. THE CHILD GOES TO SCHOOL

When a child reaches school age he usually attends a school close to his home. Since residential patterns are often determined by the socioeconomic and racial-ethnic background of his parents this means that the children he goes to school with are likely to be similar to himself in a number of ways. Moreover, if there are any advantages or disadvantages that accrue from this similarity they may not only be passed on through the years of schooling but, as we shall see later, may affect the educational process itself.

Given this relationship between the child's attributes and those of his schoolmates, we may inquire as to its magnitude. One way of assessing this is by observing the magnitude of the squared correlation between the student's and schoolmates' attributes. The latter is represented by the schoolmates' mean score on these attributes.[34] The squared correlation so obtained is regarded as the percentage of total variation in an attribute that is associated with the schools students attend.

If some schools were remarkably more effective than others we would expect that the longer a student stayed in school the more pronounced would become the association of his attributes with those of his schoolmates. We would expect this particularly with regard to curriculum-related attributes such as Achievement. That we do *not* observe such a trend is evident from figure 9.15. Here,

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[34] The computational rationale for this is explained in chapter 1 and appendix A; the actual analyses will be found in chapters 5 and 7.

FIGURE 9.15 - PERCENT OF VARIATION IN INDIVIDUAL STUDENT ATTRIBUTES ASSOCIATED WITH SCHOOL ATTENDED, BY GRADE LEVEL

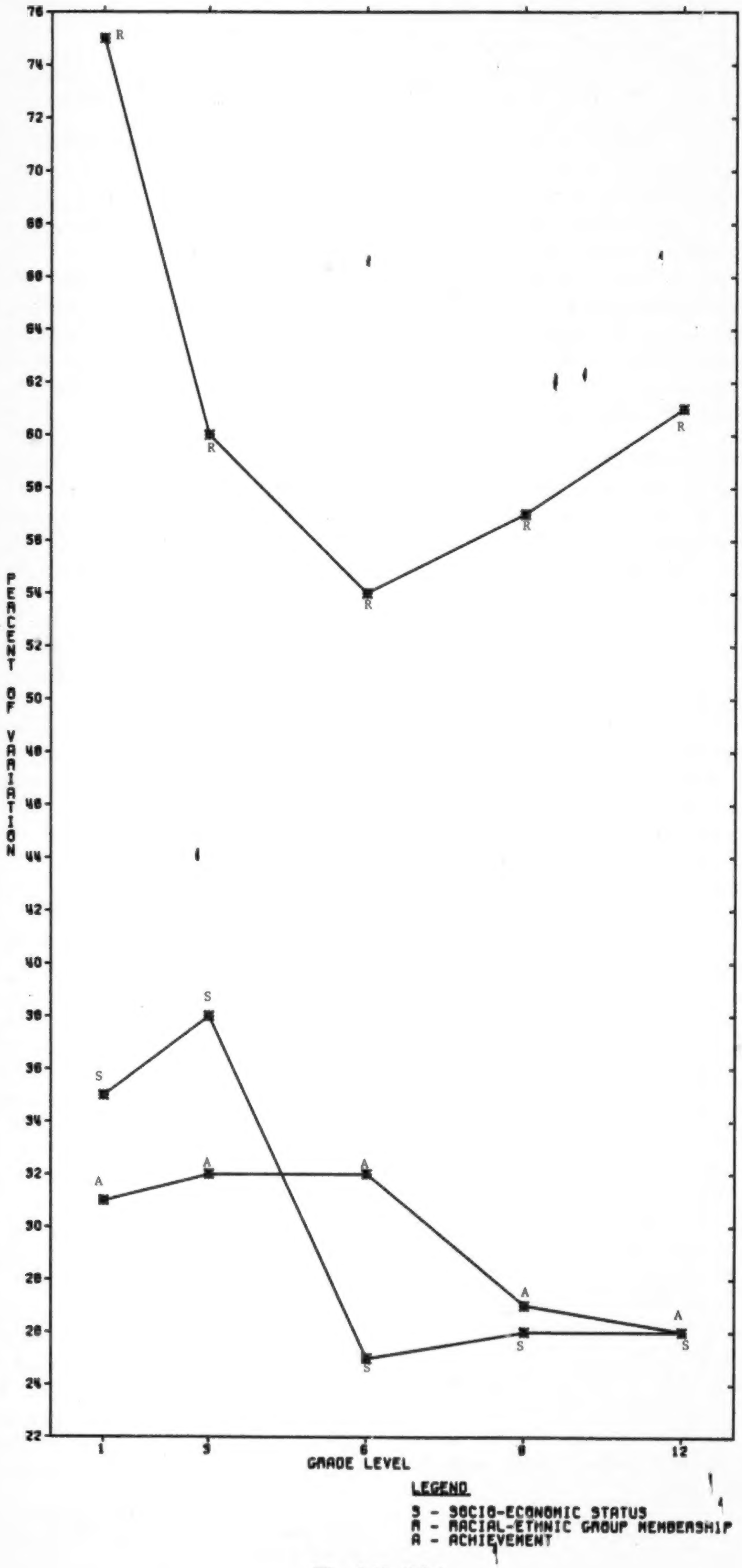

Fig. 9.15 (36a)

the relevant percentages have been plotted by grade level for Socio-Economic Status (SES), Racial-Ethnic Group Membership (RETH), and Achievement (ACHV). For example, the percentage for SES is the squared correlation of each student's SES with the SES composition of the students in his school at that grade level. The lines in the figure show that SES and ACHV increase slightly in the lower grades only to decrease at the higher ones. On the other hand, RETH decreases from the first to third grade, and although it dips further at the sixth grade it still remains high relative to the other measures. The percentages for SES and RETH indicate the extent to which students of similar background go to school with one another. Thus the high values for RETH reflect the enormous extent to which students of similar racial-ethnic background are found in the same school.[35] The percentage for RETH is on occasion 2½ times greater than for SES.

We would expect ACHV, unlike SES and RETH, to reflect both the background of one's schoolmates and the influence of the school. In the early years, especially at the first grade, the percentages for ACHV represent primarly the association of the child's ACHV with the ACHV of the children with whom he enters school. In the later years, both school and family background influences are operating. We see from figure 9.15 that the values for ACHV not only fail to increase but actually decrease, and that this also occurs for SES. This decrease at the higher grade levels reflects the so-called feeder school effect whereby students of dissimilar ACHV and SES are "fed" into the same junior and senior high schools. Since these values show no change for RETH they suggest that this "feeding" or streaming effect occurs along socioeconomic lines within racial-ethnic groups. That is, whites of differing SES tend to be grouped together at the higher grade levels, and others of differing SES tend also to be grouped this way. But very little mixing takes place between whites and other groups. The behavior of these percentages at the different grade levels shows that students are assigned to schools on the basis of their social background. It follows that the influence of schools may be difficult to disentangle from the effect of how students are assigned to them.

But we may ask, what is the behavior of the other attributes? Do they have a pronounced or systematic relationship with school attributes over the grade levels? Actually, adequate measures of the set of four variables we have called PRCS were available only at grades six, nine, and 12. They showed decreasing percentages from grade six to 12, except for Attitude Toward Life which showed a slight increase at the ninth grade.[36] The only remaining variable, Family Structure and Stability (FSS), increased at the third grade only to decline progressively thereafter. In order to give an idea of the magnitude of these percentages an average percentage for the grade levels was computed; it is given below, along with the high and low values and the range.

| Variable | Low | Average | High | Range[a] |
|---|---|---|---|---|
| Socio-Economic Status (SES) | 25 | 30 | 38 | 13 |
| Family Structure (FSS) | 6 | 12 | 19 | 13 |
| Racial-Ethnic Group Membership (RETH) | 54 | 61 | 75 | 21 |
| Expectations for Excellence (EXPTN) | 4 | 6 | 8 | 4 |
| Attitude Toward Life (ATTUD) | 12 | 14 | 16 | 4 |
| Educational Plans and Desires (EDPLN) | 8 | 9 | 10 | 2 |
| Study Habits (HBTS) | 6 | 10 | 13 | 7 |
| Achievement (ACHV) | 26 | 30 | 32 | 6 |

[a] The values represent variation over grade levels in the percent of variance associated with school means of the same variable.

These values are largest by far for SES, RETH, and ACHV. The values for the other variables are often only a small fraction of their magnitude. For example, the average value for FSS is about one-fourth the value for RETH and one-half the value for SES and ACHV.

These same analyses for different geographic groups show that, for each one of these variables, the values in the South were higher than those in the North, while in the North the values in the metropolitan areas were greater than those in the nonmetropolitan areas.[37] For each of these geographic groups the percentages for SES, RETH, and ACHV considerably exceed those for the other variables.

The analyses summarized in this section have shown that there is a pronounced tendency for students of similar family background and similar achievement levels to go to school with one another. Of the individual variables, this relationship is most pronounced for Racial-Ethnic Group Membership, Socio-Economic Status, and Achievement. In the next section we shall see how the relationship of the school variables with Achievement changes when the family background variables are taken into account.

### 9.3.1. The Benefits of Schooling

In this section we ask about the benefits that students may derive from their schooling. Do all students benefit equally, or do some derive greater benefits than others? If (as seems likely) the latter is so, what kinds of factors may be involved in these differential benefits? We are led to believe from our previous analyses that a student's FB might play a large role in the kinds of school-related experiences from which he benefits. The question, then, as we have operationally defined it, is: What are the roles played by FB and SCH factors in the development of ACHV?

This question was explored in a number of different ways in chapters 6, 7, and 8. For example, analyses of FB and SCH factors were examined for different regions of the country and for each separate racial-ethnic group, by sex. Analyses were also conducted for these latter groups to show the relative roles played by different sets of SCH factors. In this section, however, we shall deal only with results obtained when all students are included in the same framework. Accordingly, we shall not summarize analyses conducted for the separate racial-ethnic groups, by sex, although we shall refer to them on occasion. There are two major reasons for this: (1) the analyses summarized in the previous section showed that there was a marked tendency for students of the same FB, especially RETH and SES, to go to school with one another; (2) earlier analyses (Mayeske et al., 1969) showed that there was a strong systematic relationship between the socioeconomic and racial-ethnic composition of the student body and certain attributes of the teaching staff.[38] Consequently, the differences among all schools were judged to be of greater interest than were the differences among the schools attended by any one racial-ethnic group. As in previous sections, the summary will deal first with overall results and then with regional and grade-level trends. First we shall discuss the relative roles of FB and SCH, and then the relative roles played by different sets of SCH factors.

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[35] Circa 1965.

[36] See figure 7.3.

[37] See chapter 5 for these analyses, as well as for analyses of the roles played by the HB and PRCS variables at the individual and school levels.

**The Roles of Family Background and School Factors in Achievement.** To represent different aspects of the student's FB we shall use the same set of six variables as before. These were the two HB variables of SES and FSS, and the set of four PRCS variables of EXPTN, ATTUD, EDPLN, and HBTS. For most of the summaries presented here we shall also include a seventh variable, RETH, as an aspect of FB. To represent different aspects of the school we shall use different sets of variables, depending upon the kind of analysis.

The first summary deals with the relative roles played by FB and SCH factors for three different types of analyses. The first type, called T, pertains to all students combined. The second type, called T(I), pertains to these same analyses when RETH is included as an aspect of FB. To represent different aspects of the school we shall use the comprehensive set of 31 school variables plus the set of five student body variables.[39] These analyses are given in figure 9.16, which also includes the same analysis for whites. The latter is included purely for purposes of comparison, so that the effects of discrimination can be estimated (of course, certain classes of whites may also be discriminated against). For these three analyses the total $R$-square, or dependence of ACHV on the FB and SCH factors combined, is: T, 52; T(I), 53; and whites, 41. The percent of variation that can be uniquely associated with SCH independently of FB is: T, 11; T(I), 5; and whites, 4.[40] These latter values show that only a small percentage of variation in ACHV can be associated with different aspects of SCH, independently of FB.

The commonality analyses for these types of analyses after differences in the R-squares have been divided out are also given in figure 9.16. This figure shows that the role of SCH factors is about 21 percent of the common variation for the "Total" type of analysis. For this same type of analysis the role of FB is 47 percent, with another 32 percent involved in the common portion, which represents a confounding and possible interplay of FB and SCH influences. However, when RETH is considered as an aspect of FB—the results labeled "Total (I)"—the unique role for SCH factors drops to 10 percent, the role for FB stays about the same, and the common portion increases to 42 percent. Hence, the confounding of FB and SCH factors is greater when RETH is considered as an aspect of FB. Also for "Total (I)," the magnitude of the role of SCH factors becomes almost identical to that for whites. However, the role of FB and the common portion remain very different for whites. Hence in attempting to understand possible school influences we shall include RETH as an aspect of FB.[41] We shall learn more about the nature of this confounding in the next section.

We may also ask to what extent these results differ by region. Or, to phrase our question in operational terms: Where the density of nonwhites relative to that of whites is greatest, and where discriminatory practices on the basis of skin color are also greatest, do the relative roles of FB and SCH factors change in any systematic way? The analyses in figure 9.17 show that they do. For these analyses, in order to conserve on degrees of freedom, we used a set of 22 school variables.[42] These consist of 17 attributes related to the teaching staff, plus the five student body variables already described. Before we examine figure 9.17, we may note that the percent of total variation in ACHV associated with these 22 school factors,[43] when RETH is included as an aspect of FB, varies as follows: nonmetropolitan North, 3 percent; metropolitan North, 4 percent; metropolitan South, 5 percent; and nonmetropolitan South, 6 percent.[44]

When differences among the regions in their R-squares are divided out, the commonality analyses show that the relative roles of FB and SCH are systematically altered as one moves from the nonmetropolitan North through the metropolitan North to the South. It will be seen that the role of FB decreases, while that of SCH and that of the common portion increase. However, the decrease for the latter is much more pronounced than it is for the former.

We might expect that, in regions where there is a more pronounced aggregation of students into schools on the basis of their socioeconomic and racial-ethnic background, the unique role of SCH would be smaller and that of FB greater. This would be so because more of the differences among schools as they relate to ACHV could be explained by student FB factors. However, we find that exactly the opposite is the case: in regions where there is a higher density of nonwhites and discriminatory practices are greatest, the role of SCH factors is slightly greater while that of the common portions is much greater. Why should

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[38] In particular, nonwhite teachers tended to teach in and were themselves products of nonwhite educational settings that were associated with less favorable family background conditions and a lower degree of verbal skill.

[39] These 36 variables are described in chapter 1. The 5 student body variables pertain to the achievement and motivational composition of the student body.

[40] Obtained by subtracting the R-square for FB from the R-square for FB and SCH.

[41] Analyses of FB and SCH factors for the racial-ethnic groups separately showed that the role of FB exceeded that of SCH factors, but not to as great an extent as for the whites and Totals. See pp. 46, 48.

[42] The loss in predictable variance by deleting these 14 other variables was .0004 over all 133,136 9th-grade students and their 923 schools.

[43] I.e., the R-square for FB subtracted from that for both FB and SCH.

[44] See chapter 6 for these analyses.

FIGURE 9.16. - THE ROLES OF FAMILY BACKGROUND AND SCHOOL FACTORS IN ACHIEVEMENT, WITH THEIR COMMON ROLE, FOR WHITES AND FOR ALL GROUPS COMBINED

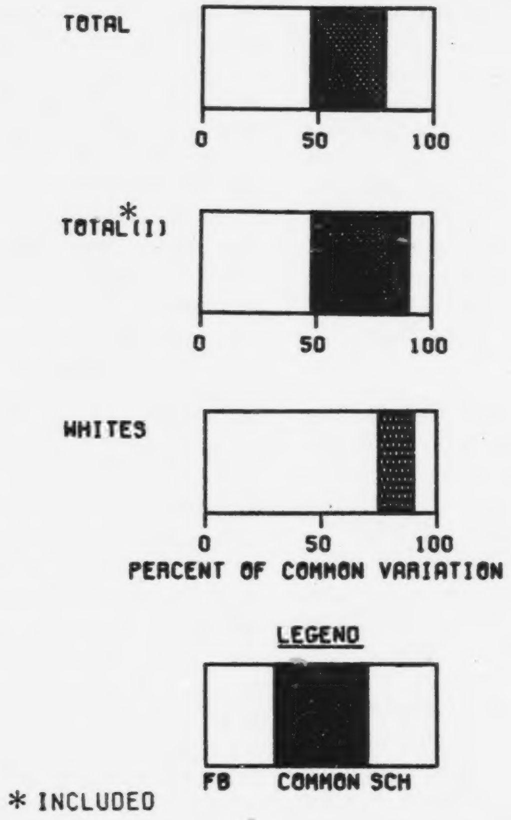
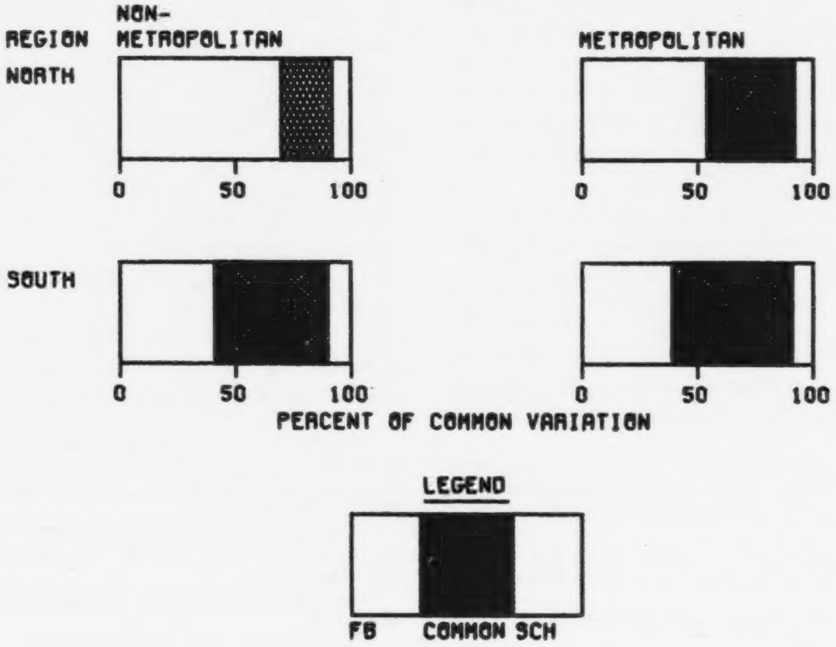


FIGURE 9.17. - VARIATIONS IN THE ROLES OF FAMILY BACKGROUND AND SCHOOL FACTORS IN ACHIEVEMENT, WITH THEIR COMMON ROLES, BY REGION



Figs. 9.16 & 9.17 (37a)

this be? In the previous section we argued that the aggregation of large proportions of students of similar background into the same schools might affect the schools' functioning. We shall return to this point when we are in a position to suggest some of the mechanisms that might be involved.

Our final question then, deals with the stability of these results for the different grade levels. We saw in chapter 7 that the ratios computed by dividing the unique value of FB by that for SCH were uniformly greater in the North than in the South for all grade levels. We also saw that in the North the magnitude of the ratios increased at the higher grade levels, while in the South they increased at the ninth grade and then decreased slightly at the 12th grade. Clearly, for all regions at all grade levels the role of FB exceeded that of SCH. However, the magnitude of the role attributed to SCH factors is dependent on the grade level and geographic locale, being greater in the South than in the North and greater at the sixth than at the higher grade levels.

In addition, we may well wonder what results would have been obtained if a number of different subsets of the FB and SCH variables had been run simultaneously. These kinds of analyses were in fact tried; they are reported in chapter 8 (p. 80). In essence, the results were that the percent of common variation that could be uniquely associated with each set was: for HB, 5; for PRCS, 22; for SO, 5; and for SCH, 0. Thus, the PRCS set continued to play a large unique role as it did in earlier analyses, even after being juxtaposed with the 31 school variables. However, the small values of 5 percent for HB and SO, as well as the zero value for SCH, suggest that there is a great deal of confounding of these variables with one another. We can get an idea of the magnitude of this confounding if we sum the unique values and subtract them from 100. This operation shows that 68 percent of the variation in ACHV that is associated with these four sets of variables is confounded or at least inseparably intertwined among them. For the two sets SO and SCH, most of this confounding was present in their two-way combination with each other, in their three-way combination with HB, and in their four-way combination with HB and PRCS. Once again, this kind of analysis not only points up the importance of the PRCS set but also helps us further understand the nature of possible school influences, most of which depend on the students' family background.

In the next section we shall attempt to summarize the roles played by different aspects of the set of school variables. In this way we should gain a better understanding of the kinds of school variables that interact with the student's background.

**The Relative Roles of School Factors in Achievement.** A variety of analyses were conducted in order to ascertain the roles played by a number of different sets of school variables. In selecting these subsets, we used the results of previous analyses as a guiding rationale. These analyses showed that the two most salient aspects of the school in explaining achievement and other school outcomes were the attributes of one's schoolmates and the attributes of the teaching staff (Coleman et al., 1966; Mayeske et al., 1969). Accordingly, analyses were conducted to determine which attributes of both played the greatest role in ACHV, and which played the greatest role when juxtaposed with one another.

In order to perform these analyses, adjustments in ACHV were first made for the seven FB variables, including RETH.[45] Commonality analyses of school variables were then conducted on the ACHV differences that remained. The first of these analyses inquired into the role played by the social composition of the students when compared with their achievement and motivation. Social composition was represented by Socio-Economic Status, Family Structure and Stability, and Racial-Ethnic Group Membership. In order to represent the students' achievement and motivation we used the five student body variables of Expectations for Excellence, Attitude Toward Life, Educational Plans, Study Habits, and Achievement. These two sets of variables are called SBSB and SO, respectively. Analyses over all students showed that, of the three SBSB variables, the racial-ethnic composition of the students played the greatest role—until RETH was included as an aspect of FB. After ACHV was adjusted for FB (including RETH), the socioeconomic composition of the students was found to play the greatest role.[46] Similarly, of the five SO variables, the achievement mix of the students played a much greater role than their motivational mix (i.e., the other four SO variables).[47] When these two sets of variables, SBSB and SO, were juxtaposed with one another, SBSB was found to have a unique value of 10 percent, and SO a value of 73 percent. The portion in common was 17 percent. Hence the achievement and motivation of the students one goes to school with play a far greater role in one's own achievement than does their social composition.

We next inquired into the magnitude of the roles played by the different attributes of the teaching staff. Earlier analyses had shown that a set of five of these teacher attributes was related to school outcomes both before and after adjustments were made for the social composition of the student body (Mayeske et al., 1969). These five attributes were: verbal skills; racial-ethnic composition; the teacher's view of teaching conditions; the teacher's preference for working with students of different ability levels; and the teacher's salary and degree levels. This set of five attributes was juxtaposed with a set of six attributes of the teaching staff. These were the teaching staff's experience; its socioeconomic background; the localism of the schools it had attended; the nature of the colleges it had attended; its involvement in teaching-related activities; and the proportion of females it contained. Commonality analyses of these two sets of variables over all students, after ACHV had been adjusted for FB, yielded the following percentages: 21 percent for the unique role of the set of six attributes; 76 percent for the unique role of the set of five attributes; and 3 percent for the common portion. Thus the set of five attributes plays a much greater role in ACHV, independently of the student's FB, than does the set of six attributes.[48]

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[45] Actually, three kinds of analyses were run: one, in which ACHV was not adjusted; one in which it was adjusted for HB; and one in which it was adjusted for FB. See chapter 6.

[46] Analyses of the separate racial-ethnic groups showed that, after adjustments were made for FB, the racial-ethnic composition of the student body played a greater role than their socioeconomic composition for Indians and Mexican-Americans, while the reverse was true for Puerto Ricans, Negroes and whites. However, there was a great deal of overlap, which indicated that, over all schools, to change the mix with regard to one of the variables would also change the mix with regard to the others. See table 6.4.

[47] This was true for each separate racial-ethnic group except Oriental-Americans, as well as when all students were combined, both before and after adjustments were made for FB. Oriental-Americans showed a greater sensitivity to the motivational mix of the students. See table 6.5.

Our final question in this section focused on the relative roles played by the set of five teacher attributes when juxtaposed with the set of five student body variables. Commonality analyses of these two sets of variables, after ACHV had been adjusted for FB, yielded the following percentages: SO, 83 percent; set of five teacher attributes, 3 percent; common portion, 14 percent. Thus the role of the student body's achievement and motivation far outweighs that of the set of five teacher attributes. This is so independently of the student's FB.[49]

From these analyses we can begin to sense the kinds of variables that may be having an influence, and the manner in which this influence may be making itself felt. We have seen that the students' motivation and achievement play a greater role in individual ACHV than does their social composition, independently of the individual student's FB. It seems that the only reason the social composition of the students enters the picture at all is because there is such a pronounced aggregation of students into schools on the basis of FB, and FB is in turn correlated with entering ACHV levels. For all students, including those of each racial-ethnic group, the basic influencing mechanism appears to be the aforesaid achievement and motivational factors rather than skin color or class membership. The influence of the teachers is manifested chiefly in this connection; only some 3 percent of its contribution is independent of the student body mix.

We have still not explained the greater independent role of SCH factors in the South. It has already been demonstrated that, for each separate racial-ethnic group as well as for all groups combined, the role of SCH factors that was independent of FB tended to be greater in the South than in the North. The main exception was for whites, who were more nearly equal in this regard. When the relative roles of SO and T(5) were examined, the role of SO always exceeded that of T(5). However, the extent to which this was so did not appear consistently greater for any one region. The one consistent regional trend that did emerge was for the measures of confounding or overlap for SO and T(5) to be greater in the South than in the North. How, then, do we explain these regional differences? Let us try, briefly, to explain the entire process of schooling, and then see how this explanation applies to regional variations.

We saw earlier (p. 118) that there is a pronounced aggregation of students into schools on the basis of their FB, especially their SES and RETH. Since ACHV is substantially correlated with FB, this means that there is also considerable disparity among schools in the ACHV level of their entering students. And it is this level that establishes the "going rate" or acceptable level of achievement, which once established has an effect on each individual student's ACHV, independently of his FB. The influence of the teachers is manifested, for the most part, through this rate. The allocation of students into schools on the basis of their FB and their ACHV is more pronounced in the South than in the North. It follows that variations in the "going rates" among schools would also be greater there, and hence that SCH factors would have a greater role independently of FB. According to this line of reasoning, the confounding of SO and T(5) would also be greater in the South than in the North.

To return to our original question: Who benefits most from this process? Clearly, the answer is that whites and Oriental-Americans benefit most. However, discussion of why they do so is best postponed until this section has been summarized.

### 9.3.2. Summary

In this section we addressed questions concerned with student body characteristics and their possible benefits to the individual. Our analyses showed that:

1. There is a pronounced tendency for students of similar FB—especially similar SES, RETH and ACHV—to attend school with one another.

   (*a*) This tendency is more pronounced in the South than in the North; in the North it is more pronounced in metropolitan than in nonmetropolitan areas.

2. The dependence of ACHV on FB and SCH factors, and the dependence of ACHV on SCH factors that were independent of FB, were found to be greater in the South than in the North.

3. Our analyses showed that the most appropriate model for studying possible school influences was when all students were included in the same framework, and RETH was included as an aspect of FB.

   (*a*) For this model, 10 percent of the variation common to both FB and SCH factors was uniquely associated with SCH factors, another 48 percent was unique to FB, and 42 percent was common to both FB and SCH factors. This 42 percent represents a confounding and possible interplay of these factors.

   (*b*) The role of FB was found to exceed that of SCH factors by about 9 to 1 in the nonmetropolitan North, 7 to 1 in the metropolitan North, and 4 to 1 in the South.

4. When FB and SCH factors were each subdivided into a set of three HB measures, a set of four PRCS measures, a set of five student body variables (SO), and a set of 31

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[48] This tended to be true also for each of the separate racial-ethnic groups (except Puerto Ricans). However, the extent to which the role for the set of five exceeded that for the set of six was somewhat less, and the common portions were somewhat greater. For Puerto Ricans the roles were more nearly equal. See table 6.6.

[49] It was also true for each separate racial-ethnic group. However, the extent to which it was so was not always as great. See table 6.7 and chapter 8.

other school variables (SCH), the following percentages of common variation could be uniquely associated with each: HB, 5; PRCS, 22; SO, 5; and SCH, 0. Hence, while PRCS had the largest unique role, 68 percent of the common variation was confounded among the four sets of variables.

5. Analyses of the relative roles of school factors that were independent of the FB factors (including RETH) showed that:

(*a*) The role of a set of five student body variables pertaining to the achievement and motivation of the student body (SO) was about seven times greater than the role of a set of three student body variables pertaining to their socioeconomic and racial-ethnic mix:

(*i*) In the mix of student body achievement and motivation, by far the greater role is played by achievement.

(*ii*) For all students, Socio-Economic Status, after ACHV has been adjusted for FB including RETH, is the most important factor.

(*b*) A set of five attributes pertaining to the teaching staff's racial-ethnic composition, verbal skills, view of their teaching conditions, preference for students of different ability levels, and teaching and salary levels, was found to play a role almost four times greater than did a set of six other teacher attributes.

(*c*) The role of the student body's achievement and motivation was found to exceed that of the five teacher attributes by a factor of about 6 to 1. These two sets of five variables each were more highly confounded in the South than in the North.

In the light of these findings it might be hypothesized that the basic process of schooling runs somewhat as follows:

1. There is a pronounced tendency for children of the same FB, especially SES and RETH, to go to school with one another.

2. Since ACHV is correlated with FB, this means that among schools there is wide disparity in the ACHV levels of their entering students.

3. The ACHV mix of entering students (viz, a high proportion of low or a high proportion of high-achieving students) sets the "going rate" or acceptable level of performance which, once established, has an effect on each student independently of his own FB.

4. The attributes and possible influence of the teachers are manifested in large measure through this "going rate."

5. Since the allocation of students into schools on the basis of their FB is more pronounced in the South than in the North, both the effect of the "going rate" and the confounding of teacher attributes with it tend also to be more pronounced there.[50]

Who then, benefits most from this process? We saw above that students who entered school with a relatively high level of ACHV sustained that level throughout the years of schooling, whereas students who entered with a low level stayed low (p. 113). We attributed most of these group differences to FB and its interrelated role with SCH factors. What *is* uniquely attributable to the school is the establishment of the "going rate." Initially, we suggest, it depends upon the ACHV levels of the entering students. Once established, however, it operates independently of the students' FB. Accordingly, those students who benefit most from their schooling are those who enter school with high average ACHV levels, and whose FB plays a sustaining and supporting role throughout the years of schooling. But their school performance is also affected by their schoolmates' achievement and and motivation. As we noted earlier, about 10 percent of the differences among students in their ACHV can be uniquely associated with SCH factors, another 48 percent can be uniquely associated with their FB, while 42 percent is in common with FB and SCH factors. The students who are high in ACHV both before and after the years of schooling are mostly whites and Oriental-Americans—and they, too, are the ones who, as groups, rank high on all the FB factors. More generally, then, we may conclude with respect to ACHV that the outputs of schooling are the inputs of society.

## 9.4. EXPLAINING RACIAL-ETHNIC GROUP DIFFERENCES IN ACHIEVEMENT

We noted above that the families of students from different racial-ethnic groups occupied quite different positions with regard to what we have called the structural aspects of society, namely, Socio-Economic Status and Family Structure and Stability (see figure 9.1). We therefore decided to incorporate these kinds of racial-ethnic group differences into our analysis. In order to do this it was necessary to order or rank the groups on some criterion. Since ACHV was our primary dependent variable, we chose to create a variable that captured the differences among these groups by assigning to each student the average score obtained by members of his racial-ethnic group—a technique known as *criterion scaling*.[51] We further noted that the relationship between a variable that was criterion scaled and the criterion against which it was scaled was a maximum, that is, the largest relationship that the variable could have with the criterion. For our racial-ethnic group membership variable, which we called RETH, this means that its relationship with ACHV is the largest that can be obtained through use of any of a number of different scale values. There has been much controversy in recent years over the explanation of racial-ethnic group differences in ACHV.[52] We therefore inquired as to what this maximum value might be, and how the relationship of RETH with ACHV might change as a number of variables related to the social conditions of the different groups were taken into account. These variables, given in their order of inclusion, were:

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[50] We should note that even if FB and ACHV were uncorrelated such a phenomenon could be made to occur merely by allocating students into schools on the basis of their initial ACHV levels.

[51] See figure 9.2 and chapter 4 for details of these analyses.

[52] See, for example, the spring and summer issues of the *Harvard Educational Review* for 1969.

NONE: This is the squared correlation of RETH with ACHV before the relationship of any other variables with ACHV has been taken into account.

SES: This is the percentage of total variation in ACHV associated with RETH after SES has been taken into account.[53]

HB: This is the percentage of total variation in ACHV associated with RETH after SES and FSS have both been taken into account.

FB: This is the percentage of variation in ACHV associated with RETH after HB and PRCS have both been taken into account.

FB, A: This is the percentage obtained after both FB and Area of Residence have been taken into account.[54]

FB, A, SO: This is the percentage obtained after FB, A, and the five student body or School Outcome (SO) variables have been taken into account. This latter set represents the student body's achievement and motivation. As we have seen in the previous sections, it is a measure of both residential and school segregation by virtue of its correlation with the students' social composition. It is also a measure of the aggregate effect of schooling.

Figure 9.18 shows these analyses for the sixth-grade students.[55] It is clear that 24 percent of the total differences among students in their ACHV can be associated with RETH before any differences among the groups in their social conditions are taken into account. But after SES is taken into account this percentage drops to 10.9, and after HB (SES and FSS) is taken into account it drops still further, to 9.3. When the six FB variables are taken into account (viz, HB and PRCS) the percentage is 8.5, and after Area of Residence (A) is taken into account it becomes 7.6. Finally, when FB, A, and SO are taken into account the percentage drops to 1.2—a figure so small as to be of little concern to us. Since all these variables are social in nature and origin, it would seem difficult to argue in favor of some other type of explanation.

We realized, of course, that the order in which these variables were entered into the analysis could affect the shape of the line in figure 9.18, though it would not affect the beginning value of 24 percent and the end value of 1.2 percent. However, in order to eliminate the possible effects of order, we ran commonality analyses. These showed that the largest unique value by far was for PRCS, followed by HB and SO. Of course, RETH retained its value of one percent, while A was completely confounded with other sets of variables (see p. 86).

We chose the values at the sixth grade for this analysis because they were the largest. Let us now compare them with values at other grade levels. To depart from our usual procedure, we may ask first about grade-level trends, and then about regional variations. For each of the three grade levels the percent of variation for the "NONE" and "FB, A, SO" conditions is:

| Grade | NONE | FB, A, SO |
|---|---|---|
| 12 | 20 | 1.1 |
| 9 | 22 | 1.0 |
| 6 | 24 | 1.2 |

Thus for each grade level, although the percentage before any conditions have been taken into account varies from 24 at the sixth grade through 22 at the ninth grade to 20 at the 12th grade, the corresponding percentage after a variety of social background conditions have been taken into account varies hardly at all, and is reduced to 1, or close to 1. Comparable values for each region at the ninth grade are:

| Region | NONE | FB, SO |
|---|---|---|
| Nonmetropolitan North | 14 | .9 |
| Metropolitan North | 20 | .9 |
| Metropolitan South | 25 | .8 |
| Nonmetropolitan South | 27 | .5 |

NOTE.—The set of variables known as Area of Residence (A) was eliminated from these analyses.

These analyses show that within each of the regional groups the squared correlation varies from a low of 14 percent in the nonmetropolitan North to a high of 27 percent in the nonmetropolitan South. However, after the "FB and SO" adjustment the correlation of RETH with ACHV drops to less than 1 percent for each regional group. Consequently, our previous conclusions receive strong reinforcement: for all practical purposes, almost *all* of the differences in ACHV associated with RETH can be explained by variables that are primarily social in nature and origin. As a convenience, let us adopt the sixth-grade values of 24 percent and 1 percent as being, respectively, the maximum and minimum values.

We have seen in this section that about 24 percent of the differences among students in their Achievement is the maximum that can be associated with their Racial-Ethnic Group Membership. However, after a variety of social background conditions have been taken into account the maximum percentage of ACHV that can be associated with RETH is about 1 percent. Since these background conditions are primarily social in nature, and since they explain almost all the differences in ACHV that are associated with RETH, it seems difficult to argue that racial-ethnic group differences in achievement arise from any inherent predispositions of one group as compared with another. Indeed, these analyses as well as others in this study suggest lines along which racial-ethnic differences in achievement might be equalized.

## 9.5. FACTORS IN ACHIEVEMENT INDEPENDENT OF RACIAL-ETHNIC GROUP MEMBERSHIP

In this section we shall outline a number of analyses that might be termed heuristic in nature. That is, they

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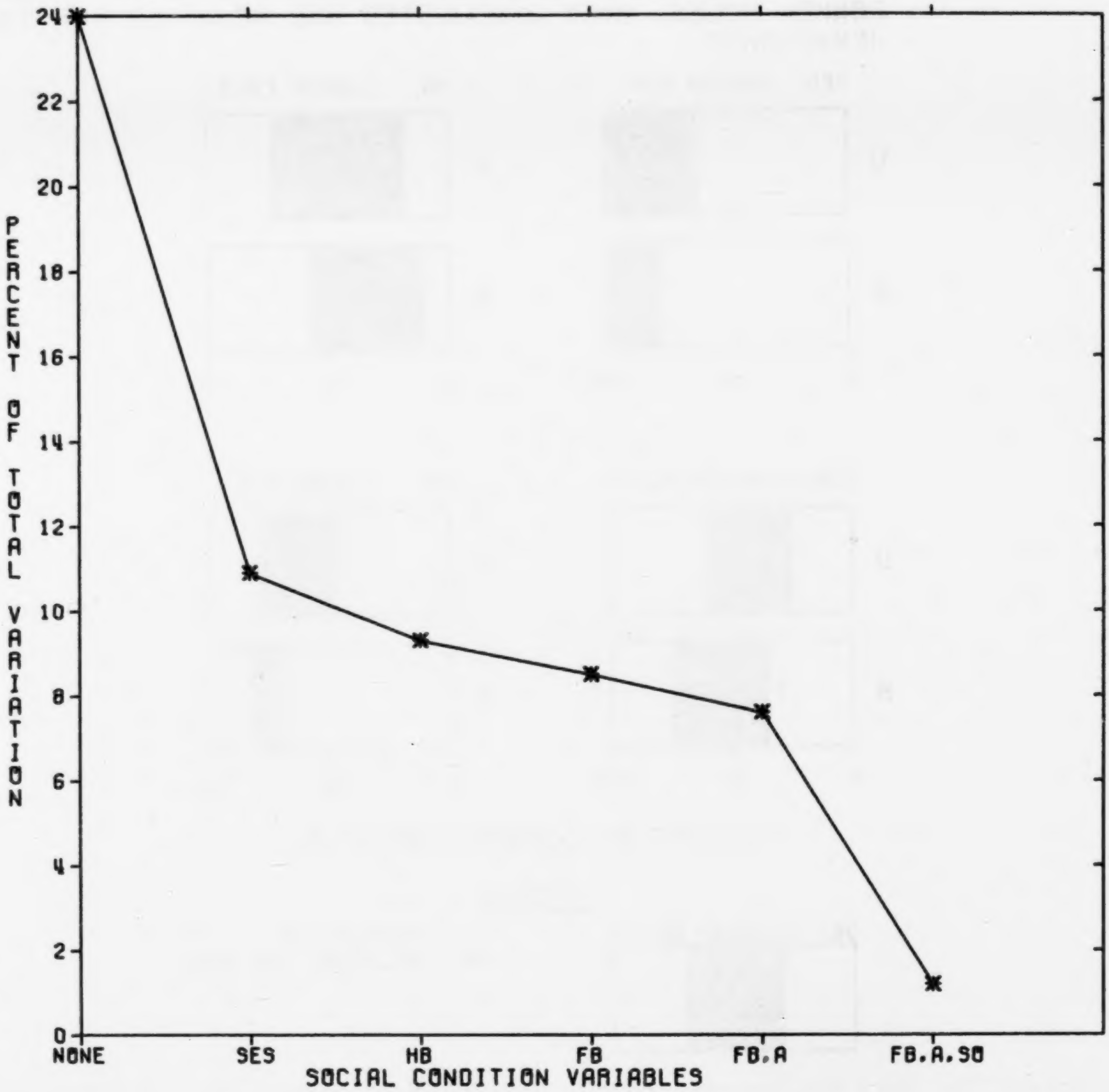
[53] This value is obtained from $R^2(SES,RETH) - R^2(SES)$, and is the unique value for RETH. The same computational procedure is followed to obtain the values for RETH when other variables are taken into account (see p. 84).

[54] See p. 70, for a description of the variables that make up Area of Residence.

[55] See p. 85, for the different grade-level analyses.

FIGURE 9.18. - PERCENT OF TOTAL VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY RACIAL-ETHNIC GROUP MEMBERSHIP, FOR THE 6TH GRADE



suggest the kinds of variables that *might* be involved in ACHV if the differences among the racial-ethnic groups in their ACHV were more nearly equal. In other words, we assumed that the United States was a society in which, on the one hand, people belonged to different socioeconomic groups, with corresponding differences in their achievement levels and educational values, but in which, on the other hand, racial-ethnic group membership was completely unrelated to achievement. Assuming these conditions, let us ask about the relative roles that would be played by many of the sets of variables that we examined previously. In order to perform these analyses, we first have to adjust ACHV for its association with RETH, using partial correlation techniques. Regressions are then performed on the residual scores.[56] The dependence of ACHV on other sets of variables once these adjustments have been made will not be discussed. However, appropriate cross-references will be made.

Figure 9.19 presents a graphic summary of these analyses for many of the different sets of variables we examined earlier. Included also, for comparison, are the results of analyses before adjustments were made for RETH. These latter analyses, designated "U," have been carried over from previous sections. The analyses after adjustments have been made for RETH are designated "R."

The first set of analyses focuses on the relative roles

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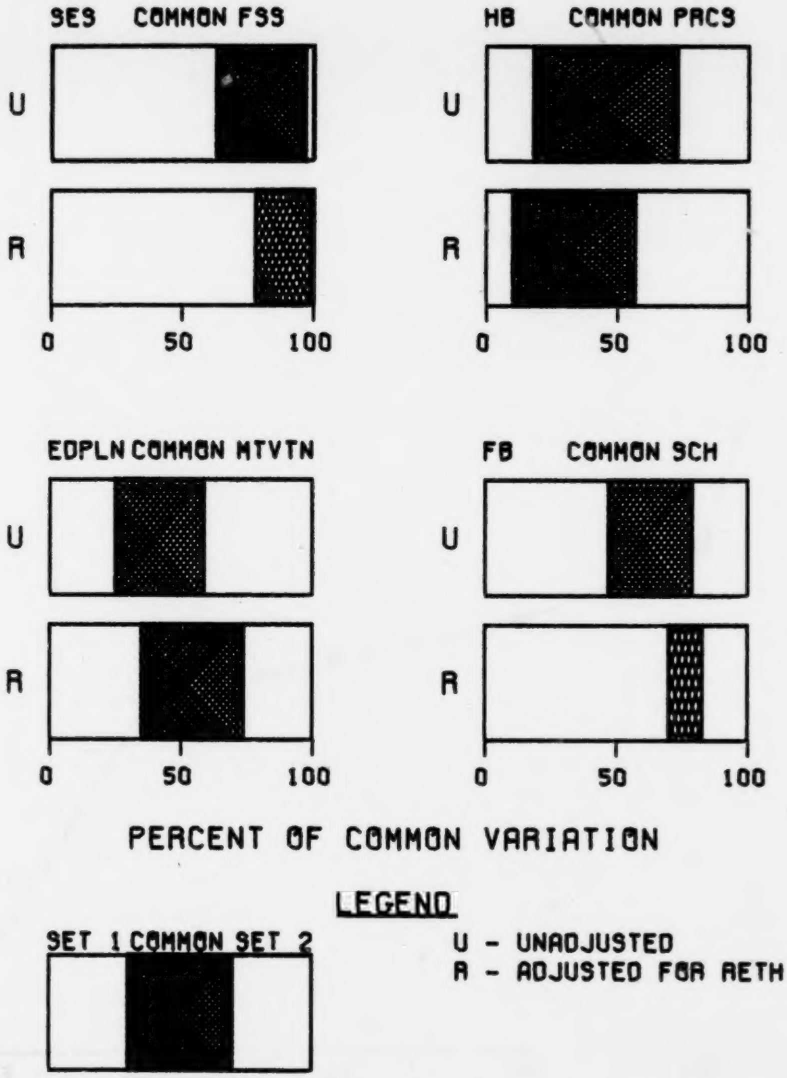
[56] This is the same kind of procedure used in studying the relative roles of EDPLN and MTVTN (p. 110).

FIGURE 9.19. - THOSE PORTIONS OF THE ROLES OF FAMILY BACKGROUND AND SCHOOL FACTORS IN ACHIEVEMENT THAT ARE INDEPENDENT OF RACIAL-ETHNIC GROUP MEMBERSHIP, WITH THEIR COMMON ROLES, BOTH UNADJUSTED AND ADJUSTED FOR SUCH MEMBERSHIP



played by SES and FSS.[57] These show that, after adjustments in ACHV are made for RETH, the role of SES increases while that of FSS and of the common portion decreases. These same kinds of changes were noted for each region; however, the extent to which SES exceeded FSS after these adjustments were made was greater in the South than in the North. Also, the common portion became smaller in the South than in the North. Similar results were obtained for the other grade levels (see table 7.1). Thus if we compare the roles of SES and FSS both before and after considerations of RETH have been set aside, we find that in the latter case the role of SES looms larger, and its confounding with FSS is greatly reduced.

The next set of analyses focuses on the relative roles played by HB (i.e., SES plus FSS) and PRCS, with these same kinds of adjustments (see table 4.7). These analyses show that once RETH is taken into account the magnitude of the role of HB and the common portion each decrease by about 8 percent, while the role of PRCS increases by about 16 percent. These same kinds of changes were noted for each region; however, the role of PRCS was found to exceed that of HB to a greater extent in the North than in the South, both before and after these adjustments were made. Similar results were obtained for the other grade levels, except that PRCS was found to exceed HB to a greater extent at the higher than at the lower grade levels (see table 7.3). Consequently, when considerations of RETH have first been put aside, the role of PRCS variables comes to exceed that of HB variables by a factor of about 4, while their confounding becomes somewhat less pronounced.

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[57] See chapter 4, figure 4.1, for the *R*-squares, and table 4.6 for the regional analyses.

Analyses of the roles of EDPLN and the other three PRCS measures, called MTVTN, showed that, after adjustments were made for RETH, the magnitude of the role played by EDPLN as well as the common portion increased, while that of MTVTN decreased.[58] This same trend was observed in each region; however, the extent to which EDPLN exceeded MTVTN was smaller, and the common portions larger, in the North than in the South. Somewhat similar results were obtained for the other grade levels except that MTVTN was still found to exceed EDPLN at the twelfth grade (see table 7.4). As for the various PRCS measures, we saw in the previous chapter that EDPLN played the largest role until adjustments were made for HB, when its position was taken by Attitude Toward Life (ATTUD). But after adjustments were also made for RETH, EDPLN again assumed the largest role. These analyses show the dependence of ACHV on both ATTUD and RETH after considerations stemming from HB have been set aside. For instance, it is clear that ATTUD figures importantly in ACHV above and beyond the student's HB. However, after considerations of RETH have been set aside, the role of MTVTN, including ATTUD, is diminished in favor of the student's longer range educational plans, as represented by EDPLN.

Commonality analyses of the relative roles of FB and Area of Residence (A) yielded the following values before and after adjustment was made for RETH:

| | FB | Common | A |
|---|---|---|---|
| U | 91 | 5 | 4 |
| R | 94 | 4 | 2 |

Thus the role of FB looms very large both before and after adjustment for RETH. However, after considerations of RETH are set aside, the roles of A and of the common portion are diminished somewhat, while that of FB is augmented.[59] Somewhat similar results were observed for the other grade levels. Hence, over all students Family Background plays a far greater role than Area of Residence.

The last of these analyses focuses on the relative roles played by the six FB factors and the set of 22 school factors, as described in chapter 6. Figure 9.19 shows that when adjustments are made for RETH quite drastic changes occur in the role of FB and the common portion alike, while the role of the SCH factors changes much less. When considerations of RETH are set aside, the role of FB increases by 23 percent, that of the common portion decreases by about 19 percent, and that of SCH decreases by about 4 percent. Similar changes were noted for each region. However, the role of FB was greater and that of SCH and the common portions smaller in the North than in the South, both before and after adjustments were made for RETH. Similar results were observed for the other grade levels, except that the role of FB exceeded that of SCH to a greater extent at the higher than at the lower grade levels (see table 7.7).

These analyses have shown that once racial-ethnic differences in ACHV have been set aside, or "equalized," then the same kinds of variables enter into the explanation of the differences that remain, but that changes occur in their relative emphasis. These changes are:

1. The role of SES is increased considerably, while that of FSS is diminished.
2. The role of PRCS is increased substantially, while that of HB is diminished.
3. The role of EDPLN is increased, while that of MTVTN is diminished.
4. The role of FB is increased slightly, while that of Area of Residence is diminished slightly.
5. The role of FB is increased dramatically, while that of SCH is decreased slightly.

### 9.5.1. Family Background Factors in Achievement Independent of School Attended and Racial-Ethnic Group Membership

So far we have dealt with the roles of different FB factors in ACHV, both alone and in combination with SCH factors. We have not, however, addressed the issue of what roles different aspects of FB would play in ACHV if differences in ACHV associated with the schools students attend were first set aside. We are not talking here about the effects of schooling versus the lack of it, for all of the students in our study attended school.[60] We are, however, talking about the roles played by different FB variables after the differences among schools associated with ACHV have first been set aside.

We perform these analyses by adjusting individual student ACHV for its relationship with differences among schools in their ACHV levels.[61] After these adjustments are performed, the differences in ACHV that remain are unrelated to any SCH variables (i.e., variables based upon differences among schools). The proportion of variation in ACHV removed by this adjustment was given in figure 9.15, above; it was shown to be about 27 percent at the ninth grade. We may anticipate that when this 27 percent is removed, the same will happen to many aspects of RETH, since it is highly correlated with differences among schools (see figure 9.15). In figure 9.20 we find a graphic summary of these analyses. For purposes of comparison we have included not only adjustments for school attended (S), but also the values obtained before any adjustments are made (U), and after adjustments are made for both school attended and RETH.[62] This latter double adjustment is designated R.

It will be seen from figure 9.20 that when considerations of school attended are set aside, the role of SES increases while that of FSS and of the common portion decreases.

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[58] For the "U" analyses adjustments are made only for HB, whereas for the "R" analyses they are also made for RETH. See table 4.8.

[59] Actually, of the separate racial-ethnic groups only Puerto Ricans and Negroes showed substantial roles for A that were independent of FB (see table 7.5).

[60] This issue is addressed on p. 143.

[61] See chapters 1 and 5 for a more detailed discussion of how these computations, called "within-school analyses," are performed.

[62] For the EDPLN-MTVTN analyses, "U" indicates that adjustments were made for HB only.

FIGURE 9.20. - THOSE PORTIONS OF THE ROLES OF FAMILY BACKGROUND FACTORS IN ACHIEVEMENT THAT ARE INDEPENDENT OF SCHOOL ATTENDED AND RACIAL-ETHNIC GROUP MEMBERSHIP, WITH THEIR COMMON ROLES, WHEN UNADJUSTED, ADJUSTED FOR SCHOOL ATTENDED, AND ADJUSTED FOR BOTH RACIAL-ETHNIC GROUP MEMBERSHIP AND SCHOOL ATTENDED

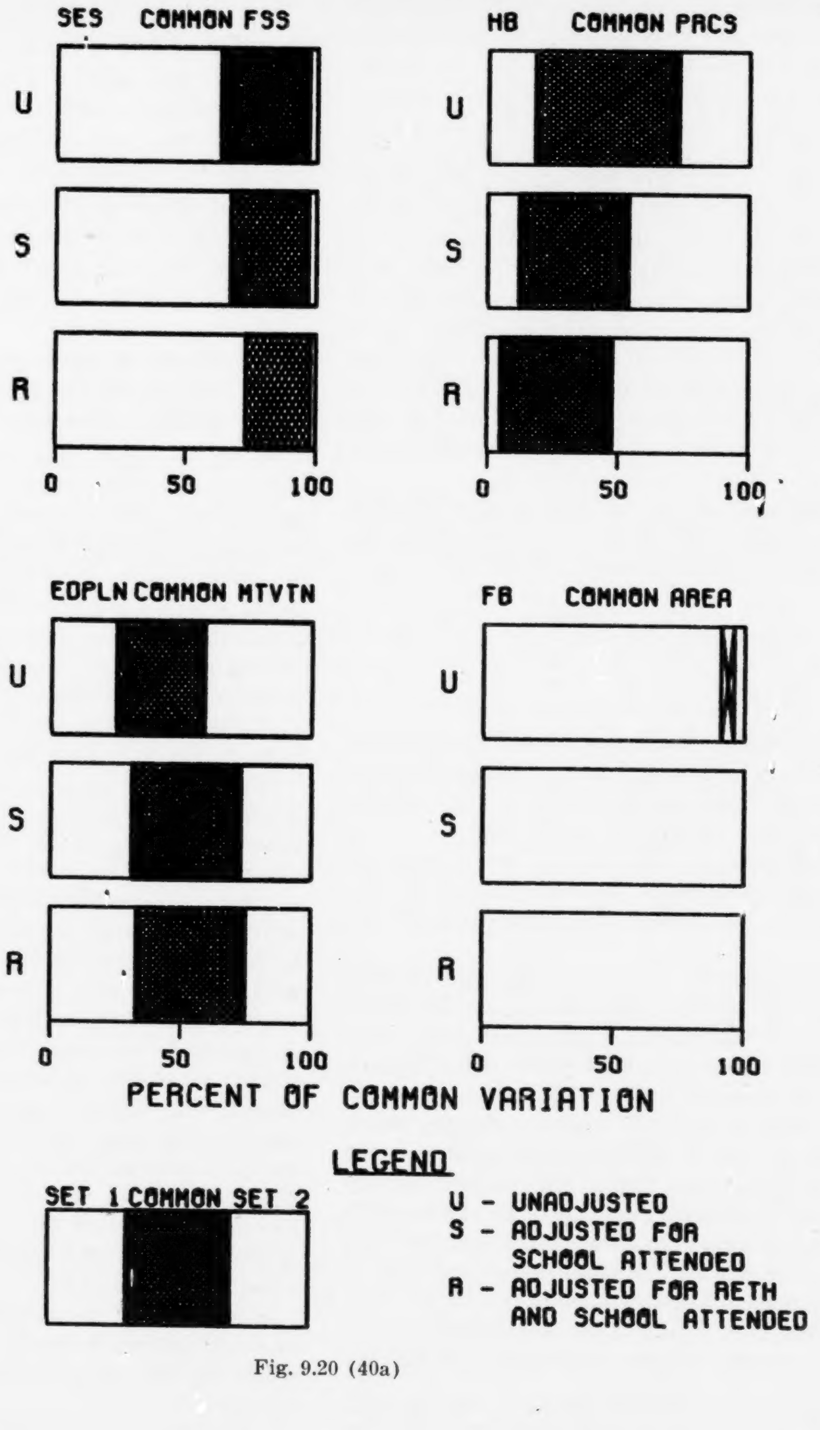

Fig. 9.20 (40a)

When considerations of RETH are also set aside, the role of SES is further augmented while that of FSS and of the common portion are further decreased. Similar trends were noted for each region. However, under each of these conditions the role of SES was lower and that of the common portion larger in the metropolitan North than in the other three regions. These same kinds of changes —SES getting larger while FSS and the common portion get smaller—were also observed for the sixth and 12th grades.[63]

With these same kinds of adjustments, analyses of the HB and PRCS sets show that the role of HB and the common portion get smaller (HB progressively so), while the role of PRCS gets progressively larger. These same kinds of changes were observed for the different regions and grade levels.[64] For all adjustments, the role of PRCS factors outweighed those of HB to a greater extent at the higher than at the lower grade levels.

When adjustments are first made for HB(U), then for HB plus school attended (S), and, finally, for HB plus school attended and RETH (R), we observe that the role of MTVTN progressively decreases. Similarly, the common portion increases with the "S" adjustment, and stays large thereafter. Although not given in the individual chapters, this same trend was noted within each of the four regions. In fact, as these different adjustments were made, the different regional values became remarkably similar to each other and to the total values given in figure 9.20. Consequently, as considerations of HB, school attended, and RETH are set aside, the role of EDPLN comes to exceed that of MTVTN by a factor of about 1.3 to 1, while their confounding and possible interplay is also augmented.

Figure 9.20 shows that Area of Residence plays a slight role, independent of FB, until considerations of school attended are set aside. At this time, however, the unique role of Area of Residence and its common portion with FB go down to zero. These same kinds of results were obtained for the other grade levels—that is, the values for Area of Residence were negligible, but not always zero.

We have seen that, as considerations of school attended and RETH are set aside:

1. The role of SES increases while those of FSS and the common portion decrease.
2. The role of PRCS increases while those of HB and the common portion decrease.
3. The role of EDPLN and the common portions increase while that of MTVTN decreases.
4. The role of FB increases while those of Area of Residence and the common portion approach zero.

* * *

Before proceeding to a summary of this chapter a brief overview will be given of the last two sections. These sections have shown that:

1. About 24 percent of the total differences among students in their Achievement was the maximum that could be associated with their Racial-Ethnic Group Membership.

    (*a*) After consideration of differences among students in their Socio-Economic Status, their Family Structure and Stability, their belief in what an education could do for them, their parents' involvement with them in their school performance (PRCS), their Area of Residence, and the achievement and motivation of their schoolmates (SO) were all set aside, this value dropped to 1 percent.

2. When considerations of racial-ethnic differences in Achievement were set aside, the following roles of FB factors in ACHV were observed:

    (*a*) The role of SES was considerably augmented, while that of FSS was diminished.

    (*b*) The role of PRCS factors was substantially increased, while that of HB was diminished.

    (*c*) The role of EDPLN was increased, while that of MTVTN was diminished.

    (*d*) The role of FB was slightly increased, while that of Area of Residence was slightly diminished.

    (*e*) The role of FB increased dramatically, while that of SCH decreased slightly.

3. When considerations of school attended *and* RETH were set aside, the following roles of FB factors in ACHV were observed:

    (*a*) The role of SES increased while that of FSS and the common portion decreased.

    (*b*) The role of PRCS increased while that of HB and the common portion decreased.

    (*c*) The role of EDPLN and the common portion increased while that of MTVTN decreased.

    (*d*) The role of FB increased while that of A and the common portion approached zero.

## 9.6. SUMMARY

In this chapter, we began by reviewing the background of the present study and then gave a general description of its methodology. We then attempted to synthesize the main findings of the previous chapter by focusing on what our study has to say about the impact of the family on the child.

We first remarked upon the close interdependence of Socio-Economic Status, on the one hand, and Family Structure and Stability, on the other. By creating the variable known as Racial-Ethnic Group Membership, we were able to systematically study differences both within and among each of the racial-ethnic groups.

We then went on to ask to what extent Achievement was associated with Family Background for each racial-ethnic group. Family Background was represented by Socio-Economic Status and the following Family Process Measures: Expectations for Excellence; Attitude Toward Life; Educational Plans and Desires; and Study Habits. We found that, for most regions, there was a tendency for Achievement to depend more on Family Background for females than for males. Moreover, some racial-ethnic groups depended more on Family Background in some regions than in others (the level of diversity was greater in the South). The percentage of variation in Achievement explained by Family Background increased at the higher grade levels for whites and Negroes, while declining for Mexican-Americans and Puerto Ricans. These and similar effects were shown to be a function of both group diversity and region.

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[63] These analyses are not presented in the individual chapters, since they were not the ones of major interest. However, the HB and PRCS analyses, which were deemed of special interest, are given in chapters 5 and 7.

[64] See chapters 4, 5, and 7.

Next, we examined the relative roles in the development of Achievement, of Socio-Economic Status, and of Family Structure and Stability. We found that, for every group except Oriental-Americans, the unique role of Socio-Economic Status exceeded that of Family Structure and Stability. The latter variable played a larger role for males than for females in the great majority of cases. For Oriental-Americans, the unique roles of both variables are nearly equal. For Negroes and whites, the relationship of FSS to Achievement is small, despite the fact that the rate of father presence in the home is about 82 percent for the latter and about 55 percent for the former. In a search for some explanation of this phenomenon, we explored the role of Family Structure and Stability that was independent of Socio-Economic Status for different regions and grade levels.

The extent of regional variation in the independent role of Family Structure and Stability we found to be highest for Puerto Ricans and lowest for whites. For Negroes, however, it was next to lowest. We therefore abandoned the hypothesis that variation was greater for nonwhite groups in general. Further exploration indicated that variations in Family Structure and Stability were not systematically related to regional differences at all.

Examination of the role of Family Structure and Stability by grade level produced at least one paradoxical result: for Negroes and whites, this role was always small, while for other groups it was often quite large. However, we had already established that, for Negroes and whites, there was no direct relationship between Family Structure and Stability and Achievement. What intervening variables were at work? In order to discover this, we turned to analysis of the role played by the structural aspects of the family, such as the presence or absence of fathers or the family socioeconomic status, when juxtaposed with the more behavioral variables that we had labeled Family Process.

We therefore asked, for each racial-ethnic group, whether the structural or the behavioral aspects of the family played the key role in the child's achievement level. We found that, in every case, a large independent role was played by parental involvement in the child's schooling. But when Racial-Ethnic Group Membership was introduced into the analysis as an aspect of Home Background, the role of the latter exceeded Family Process by about 6 percent. In other words, membership in a disadvantaged racial-ethnic group is a handicap that cannot usually be overcome even by intensive educationally related child rearing activities on the part of parents or parental surrogates. For whites, on the other hand, such activities outweigh the role of Home Background by about 4 to 1. Analyses by sex revealed that the role of Family Process was greater for males than females except in the case of Puerto Ricans and Oriental-Americans. Analyses by region suggested that only in the nonmetropolitan North, where color-caste institutions were less developed, were the handicaps imposed on nonwhites being overcome by educationally related child-rearing activities. Such activities were found to play a greater role at the higher grade levels, except for Negroes and Indian Americans.

These results led us to ask which home background and which family process variables were playing the greatest role in student achievement levels. We found that the set called Other Motivational Measures exerted more influence than the one called Educational Plans and Desires, except in the case of Oriental-Americans. However, for all males except Negroes and Mexican-Americans, the role of Educational Plans and Desires was greater. This was true even after adjustments had been made for Racial-Ethnic Group Membership. With the same adjustments, the role of Educational Plans and Desires came to exceed that of Other Motivational Measures to about the same extent in all regions. For most racial-ethnic groups and grade levels, this relationship held good for males but not females. Pronounced sex differences were noted in the role played by several of the motivational variables in Educational Plans and Desires.

We had already seen that not all racial-ethnic differences in achievement levels could be traced to the same processes or relationships. Whites, we had found, have the highest average level, followed by Oriental-Americans, Indian Americans, Mexican-Americans, Puerto Ricans, and Negroes. Sex differences by grade were not large, but females scored consistently higher than males up to the twelfth grade, when the trend was reversed. The improvement in the showing for males was probably due to the absence of dropouts, both male and female.

The extent of variation in achievement level across regions was least for Mexican-Americans and greatest for Puerto Ricans, Oriental-Americans, and Negroes. Differences among racial-ethnic groups tended to be greater than their internal differences by sex. Mixing conditions did not seem to have much of an effect on achievement levels except for Negroes and Puerto Ricans.

The next stage in our analysis was to examine the effectiveness of the school. If some schools were more effective than others, we would expect that the longer a child stayed in school the more pronounced would become the association of his attributes, particularly his Achievement, with those of his schoolmates. But no such trend was observed. We would also expect a child's Achievement to reflect both his schoolmates' background and the influence of his school. This was found to be true in the early years of schooling, but in the later years, school influence showed up mainly in combination with family background influence. Since students were assigned to schools on the basis of family background the problem was to disentangle the effects of the schools themselves from the effects of how students were assigned to them.

We went on to study the differential benefits derived by students from their schooling. This, too, involved distinguishing the effects of family background and school factors. We found that the confounding of these two sets of factors was greater when Racial-Ethnic Group Membership was considered as an aspect of Family Background. We next examined the same set of effects by region. Our commonality analyses showed that the relative roles of family background and school factors exhibited a definite pattern of change as one moved from the nonmetropolitan North through the metropolitan North to the South: the unique role of Family Background decreased, while that of School Factors and of the common portion increased. Thus the unique role of the school was found to *increase* in proportion as Family Background was used as a criterion for allocating students to schools. These results were stable by grade level, and were not substantially affected when analyses for a number of different subsets of the family background and school variables were run simultaneously. On the contrary, the importance of the family process variables was once more underlined.

The relative roles of individual school factors were then examined in a series of analyses that built on the results of both the Coleman Report and the School Study. We first inquired into the role played by the social composition of the student body, as compared with their achievement level and motivational characteristics. We found that of the three social background variables, Racial-Ethnic Composition played the greatest role—until it was included as an aspect of Family Background, whereupon its place was taken by the students' socioeconomic composition. But the students' combined achievement and motivational mix played a far greater role in individual achievement than their social composition. Of the teachers' attributes, which we divided into two sets, by far the most significant were their verbal skills, racial-ethnic composition, view of teaching conditions, preferfence for working with students of different ability levels, and salary and degree levels. In general, we concluded that the student body's motivation and achievement played a greater role in individual achievement than did their social composition. Indeed, Home Background entered the picture only because it tended to serve as the basis on which students were allocated to schools, and because it was correlated with entering achievement levels. The greater independent role of school factors in the South could be explained in terms of the more pronounced allocation there of students to schools on the basis of their Family Background and Achievement. This in turn seemed likely to produce a greater variety of "going rates" of achievement among schools, thus giving school variables a greater role independently of Family Background.

Establishment of the "going rate" appeared to be uniquely attributable to the school. Initially, it depended on the achievement levels of the entering students. But once established, it operated independently. Accordingly, the students who benefited most from the existing school system were the ones who entered school with high achievement levels, with all that this implies about their family background. Most of these students—the ones who both entered and left school with high achievement levels—were whites and Oriental-Americans.

In order to analyze racial-ethnic differences in Achievement, we created a variable that we called Racial-Ethnic Group Membership. We then tried to find out how the relationship of this variable with achievement could be modified by taking a number of other variables into account. The result was that, even when regional differences were included in the analysis, our previous conclusions were confirmed: nearly all the differences in Achievement associated with Racial-Ethnic Group Membership could be explained by variables that were primarily social in nature and origin. In fact, after a variety of social background conditions had been taken into account, the maximum percentage of Achievement that could be associated with Racial-Ethnic Group Membership was about 1 percent.

As a postscript to the above, we decided to explore the kinds of relationship that might emerge if the United States were not a society in which racial-ethnic group membership was closely related to achievement. We found that the role of Socio-Economic Status would increase while the roles of Family Structure and Stability and the common portion would decrease. We also found that the roles of all the family process variables would increase, and that the role of Educational Plans and Desires would do so more than that of the Other Motivational Variables. Finally, quite dramatic increases occurred in the role of Family Background. On the other hand, its common portion with the set of 22 school factors decreased by almost as much, while the role of the latter decreased slightly.

Finally, we dealt with the roles that would be played by various aspects of Family Background if differences in Achievement associated with the schools were first set aside. Our analyses showed that the role of Socio-Economic Status would increase while that of Family Structure and Stability and the common portion would decrease. After similar analyses of the Home Background and Family Process sets, we concluded that the role of the former, and the common portion, would get progressively smaller, while the role of the latter would get progressively larger. Of the motivational variables, after Home Background, school attended, and Racial-Ethnic Group Membership were set aside, Educational Plans and Desires was once again the most important. The role of Area of Residence was negligible.

# Chapter 10

# HIGHLIGHTS AND RECOMMENDATIONS

This chapter touches on the salient aspects of our findings, which are presented in the form of summary analyses.

## 10.1 POSSIBLE EFFECTS OF FAMILY STRUCTURE AND STABILITY ON ACHIEVEMENT

In the early part of this study we focused on the relationships exhibited by an index called Family Structure and Stability (FSS) with an index called Achievement (ACHV). This index pertained to the presence or absence of key family members in the home, the percentage of time that the mother worked outside the home, the person who was the family's major source of income, and the extent to which the family moved around. We investigated these relationships for Indian Americans, Mexican-Americans, Puerto Ricans, Negroes, Oriental-Americans, and whites, of both sexes.

The index turned out to have a very small relationship with ACHV for both Negroes and whites. This was true even though the incidence of father absence for Negroes was among the highest for any group and that for whites was among the lowest. The relationship of FSS with ACHV was about two times greater for Puerto Ricans and Indians than for Negroes and whites, about three times greater for Mexicans, and about four times greater for Orientals. However, once differences in Socio-Economic Status (SES) among students within each of these groups had been taken into account, the relationship of FSS with ACHV almost vanished for Negroes and whites. For other groups, the relationship still persisted, but to a lesser degree.

Similar results were observed for different regions of the country. When we took into account differences among students in their Attitude Toward Life (ATTUD), that is, their feelings about their ability to influence the course of their lives and about the extent to which an education would benefit them, the relationship of FSS with ACHV vanished for both Negroes and whites. As before, a rather small relationship persisted for the other groups.

We decided to see how many different kinds of things would have to be taken into account before this relationship of FSS with ACHV vanished for these other groups. We therefore brought a number of additional variables into the analysis. These were parental and student expectations for the student's school performance (EXPTN), the activities that he and his parents engaged in that were related to his school performance—that is, his Educational Plans (EDPLN) and Study Habits (HBTS)—his area of residence in the Nation (A), and various aspects of his school that were found to be most heavily involved with Achievement.[1] After EXPTN, EDPLN, and HBTS were taken into account, the relationship of FSS with ACHV vanished for Puerto Ricans but still persisted for Mexican- and Oriental-Americans. In fact, for these last two groups a small relationship persisted even after their area of residence and the 10 school-related variables were taken into account.

These analyses are summarized in figure 10.1, where the percentage of variation in ACHV that is associated with FSS is plotted for each of the following conditions:

> *NONE*: This is the squared correlation of FSS with ACHV before any other variables have been taken into account.
>
> *SES*: This is the percentage of variation in ACHV associated with FSS after SES has been taken into account. It is obtained by subtracting the squared correlation for SES from that obtained for both SES and FSS.
>
> *SES, ATTUD*: This is the percentage of variation in ACHV associated with FSS after SES and ATTUD have been taken into account.[2]
>
> *SES, MTVTN*: This is the percentage obtained after the Other Family Background Measures (OFB)—SES, ATTUD, EXPTN, HBTS, and EDPLN—have been accounted for.
>
> *OFB, A*: This is the percentage obtained after OFB and Area of Residence (A)[3] have been taken into account.
>
> *OFB, A, SCH*: This is the percentage obtained after OFB, A, and the ten school-related variables have been taken into account.[4]

The analyses in figure 10.1 do not present the whole story. We know that, since all these variables are correlated, the slope of the curves could be made to vary according to which variables were entered into the regression first. In order to accommodate this problem of "order of inclusion" we made extensive use of a technique called commonality analysis. This technique allowed us to express both the variance that was unique to each of

---

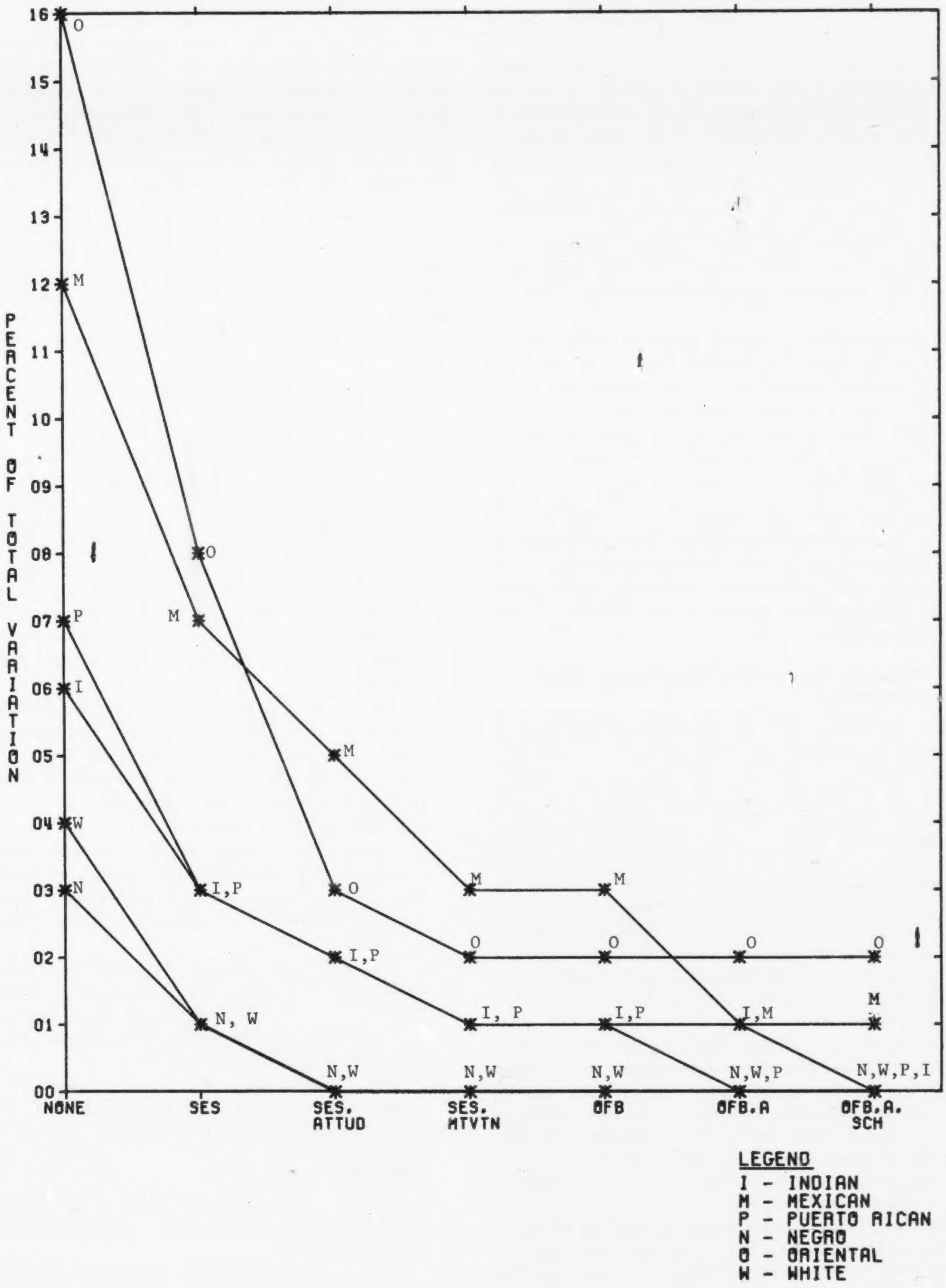
[1] Usually called SCH (10), for the combined set of five teacher attributes and five attributes relating to the achievement-motivational mix of the student body.

[2] For all these analyses, the computational rationale is for the R-square for the sets of variables being taken into account to be subtracted from the R-square obtained when all variables, including FSS, have been taken into account.

[3] Rural-suburban-urban and South-Far West-North.

[4] These analyses involve the 64,054 9th-grade males. Males were used because the relationship of FSS with ACHV tended to be greatest for them.

FIGURE 10.1. - PERCENT OF TOTAL VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY FAMILY STRUCTURE AND STABILITY INDEPENDENT OF FAMILY BACKGROUND AND SCHOOL FACTORS



a number of sets of variables and the variance that was confounded with different combinations of these sets of variables. In this way we found that, when SES and FSS were entered into the regression together, the role of SES exceeded that of FSS for every group in almost all regions. However, there was a good deal of confounding of SES with FSS as they related to ACHV. It was not unusual for this confounding to exceed the magnitude of the role that could be attributed to FSS independently of SES. Because of such results we decided to form a set of variables that would pertain to what we called the structural aspects of the family. This set consisted of SES and FSS and was called Home Background (HB).

The other individual student variables—EXPTN, ATTUD, EDPLN, and HBTS—were primarily attitudinal in nature. We called this set of variables Family Process (PRCS).

When the set of HB and the set of PRCS variables were entered into the regression together the unique value for the latter tended to exceed that for the former, often to a substantial extent. The same trend was observed whether these results were broken down by grade or region. Through our use of our commonality technique we were also able to note a substantial degree of confounding and possible interplay of these two sets as they related to ACHV. Indeed, when all groups were combined, the unique value for PRCS and that for HB were exceeded by their common portion. This was not surprising, since there are substantial differences among the racial-ethnic groups in SES and FSS, as well as in ATTUD and the other PRCS variables.

### 10.1.1. Measuring the Effects of Racial-Ethnic Group Membership

We also wanted to study the effect that membership in a particular racial-ethnic group might have on ACHV. In order to do this, we developed a variable that we called Racial-Ethnic Group Membership (RETH). Each student was assigned the average score obtained by members of his racial-ethnic group on the achievement composite (ACHV). This resulted in a variable on which whites scored highest and Orientals next highest, while all the other groups scored low. In order to learn more about this variable we conducted extensive analyses, some aspects of which will be discussed before we proceed with a discussion of the role played by RETH in conjunction with SES, FSS, and the four PRCS variables.

The particular technique we used to create RETH guaranteed that its relationship with ACHV would be a maximum. We found that the largest degree of variation in ACHV that could be associated with RETH was 24 percent. There was some variation from this figure by grade and region; thus values were somewhat smaller at the higher grade levels and somewhat larger in the South than in the North. Overall, however, 24 percent seemed a representative figure.

We then took into account a range of different variables pertaining to the student's Family Background—that is, HB plus PRCS—his Area of Residence, and various aspects of the school he attended. As a result, the degree of variation in ACHV that was attributed to RETH dropped to 1 percent or less, depending on grade level and region. The effect on this analysis of taking into account a particular sequence of variables is shown in figure 10.2, which is based on data obtained from the 118,106 sixth-grade students. For each step, an adjusted mean ACHV was obtained by subtracting an estimated mean from the observed mean. This estimated mean was obtained for each group by multiplying the group means on each of the regressor variables by the regression weight or weights obtained when all groups were combined. For example, with SES as the regressor variable, estimated mean ACHV for whites could be obtained by multiplying their average SES by the unstandardized regression weight obtained when all groups were combined in the same framework. The estimated value was then subtracted from the observed value to obtain mean ACHV adjusted for SES. The different conditions of adjustment were:

*NONE*: This is the mean of each group, from a distribution with a mean of 50 and standard deviation of 10, before any other variables have been taken into account. *These mean differences account for 24 percent of the differences among all students in their ACHV.* That is, if we were to subtract the mean value of each student's RETH from his ACHV, we would eliminate 24 percent of the total differences among students in their ACHV. We also found that the relative standing of these groups, as depicted in figure 10.2, was fairly stable throughout the years of schooling, and that girls tended to score slightly higher than boys until the 12th grade, when boys took the lead.

*SES*: This is the result of the mean differences obtained after differences among students in their SES have been taken into account. These adjusted mean differences account for 10.9 percent of the differences in ACHV that remain after considerations of SES have been put aside.

*HB*: This is the result of the mean differences obtained after considerations of SES and FSS have been taken into account. These adjusted mean differences account for 9.3 percent of the differences in ACHV that remain.

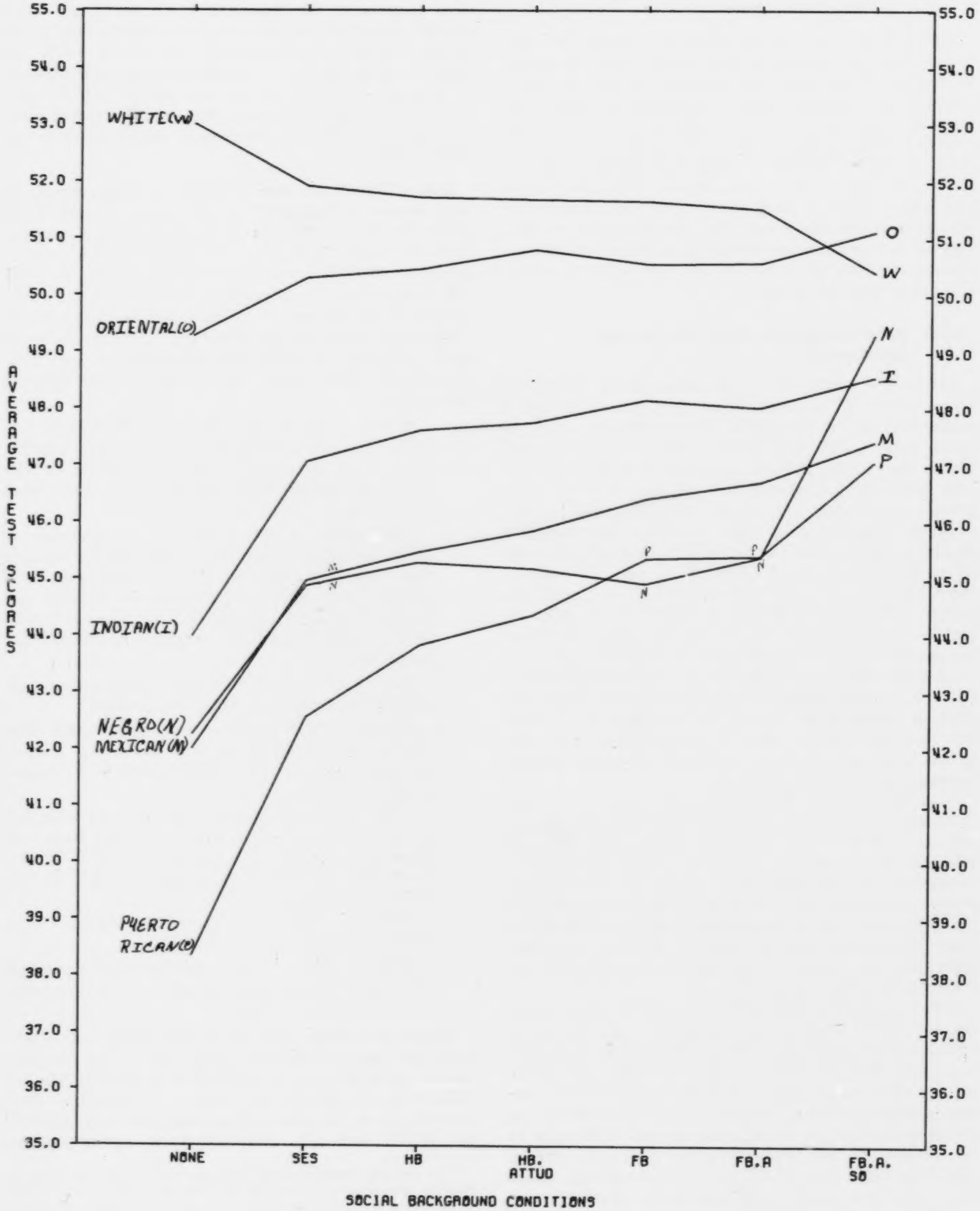
*HB, ATTUD*: This is the result of mean differences obtained after considerations of HB and ATTUD have been set aside. These adjusted mean differences account for about 9 percent of the differences in ACHV that remain.

*FB*: This is the result of the magnitude of the mean differences after considerations of HB and PRCS have been set aside. These adjusted mean differences account for 8.5 percent of the remaining difference among students in their ACHV.

*FB, A*: After FB and Area of Residence (A) have been taken into account, only a difference of 7.6 percent remains.

*FB, A, SO*: After FB, A, and the achievement-motivational mix of the students one goes to school

FIGURE 10.2. - RACIAL-ETHNIC GROUP ACHIEVEMENT MEANS ADJUSTED FOR SOCIAL BACKGROUND CONDITIONS, 6TH-GRADE STUDENTS



10.2 (42a)

with have been taken into account, only a difference of 1.2 percent remains.

Figure 10.2 shows that the differences among the various racial-ethnic groups in their ACHV levels approach zero as more and more considerations related to differences in their respective social conditions are taken into account. In the light of these results, as well as the other extended analyses that were conducted in chapter 4, we chose to regard RETH as truly representative of the social structure's color-caste aspects. We also judged that RETH could be more meaningfully assigned to the HB set than the PRCS set. This interpretation, we felt, was not unreasonable considering that disproportionately greater numbers of nonwhites are concentrated in the lower socioeconomic strata.

### 10.1.2. Home Background, Family Process, and Achievement

Let us now return to our discussion of the results obtained when RETH is entered into the analysis. We noted earlier that the relationship of FSS, our family structure index, with ACHV was much smaller for Negroes and whites than for the other groups, and that this was true both before and after different aspects of their background were taken into account. We also noted a considerable dependence of FSS on SES, and therefore decided to combine the two into a set of variables that we called Home Background (HB). When this set was entered into the regression with the set of four variables that we called Family Process (PRCS), it was observed that for each group as well as for the groups combined the unique value for the PRCS set in its relationship with ACHV exceeded that for the HB set, often quite substantially. Our commonality technique showed that there was often a considerable overlap or confounding of these two sets, particularly when all groups were combined. In this latter case, however, the role of the PRCS set still outweighed that of the HB set.

In order to bring RETH into the analysis we first observed how it related to each of the PRCS measures as well as to ACHV when placed in context with SES and FSS. For this purpose we entered all groups into the same framework, so that differences among the racial-ethnic groups could enter into the analysis. The results showed that SES had a large independent role in ACHV and a small independent role in ATTUD. FSS, on the other hand, had its largest independent role in HBTS, followed by EXPTN and ATTUD.

After combining SES, FSS, and RETH into a single set, we placed them in the regression with the set of PRCS variables in order to see how they related to ACHV. We noted that the unique values for HB and PRCS became more nearly equal, while the value of their common portion increased. Further, when we examined regional variations we found some marked differences in the results. In the nonmetropolitan North the role of PRCS exceeded that of HB, in the metropolitan North they were more nearly equal, and in the South the role of HB exceeded that of PRCS.

In our opinion, these results indicate that the color-caste aspects of the American social structure had a greater impact on Achievement in the South than in the North. We therefore concluded that where social and economic stratification on the basis of race and ethnicity is pronounced, the effect on achievement will be more difficult to overcome through educationally related child-rearing activities than where such stratification is less pronounced.

**Role of Family Process Measures in Achievement.** We have chosen to highlight the role played by each of the motivational and attitudinal variables that we have collectively called PRCS, when all the groups are kept together and RETH is entered explicitly into the analysis. The unique role or percentage of variation in ACHV accounted for by each of these variables is given for ninth-grade males and females (approximately 64,000 of each) in figure 10.3, after different aspects of their background have been taken into account. These different aspects are:

*NONE*: This is the percentage of variation in ACHV accounted for by the variable under consideration (i.e., its squared correlation with ACHV) before any background conditions have been taken into account.

*SES*: This is the percentage of variation in ACHV accounted for by each variable after SES has been taken into account. This is computed, as in previous analyses, by subtracting the squared correlation for SES from that obtained when both SES and the respective PRCS variables are entered into the regression.[5]

*HB*: This is the percentage obtained after SES and FSS have both been taken into account.

*HB (I)*: This is the percentage obtained after HB, including RETH, has been taken into account (chapter 4 explains how RETH came to be judged an aspect of HB).

*OFB*: This is the percentage obtained after HB (I) and the three other PRCS variables have been taken into account. For example, for EXPTN the three other PRCS measures would be ATTUD, HBTS, and EDPLN.

*OFB, A*: This is the percentage obtained after OFB and A have been accounted for.

*OFB, A, SCH*: This is the percentage obtained after OFB, A, and the 10 school-related variables have been accounted for.

Figure 10.3 shows that before any background conditions have been taken into account the largest relationships with ACHV are for EDPLN and ATTUD. The sex differences are seldom large except for EDPLN. Each variable shows its greatest decrement for SES; EXPTN and HBTS reach zero after differences among students

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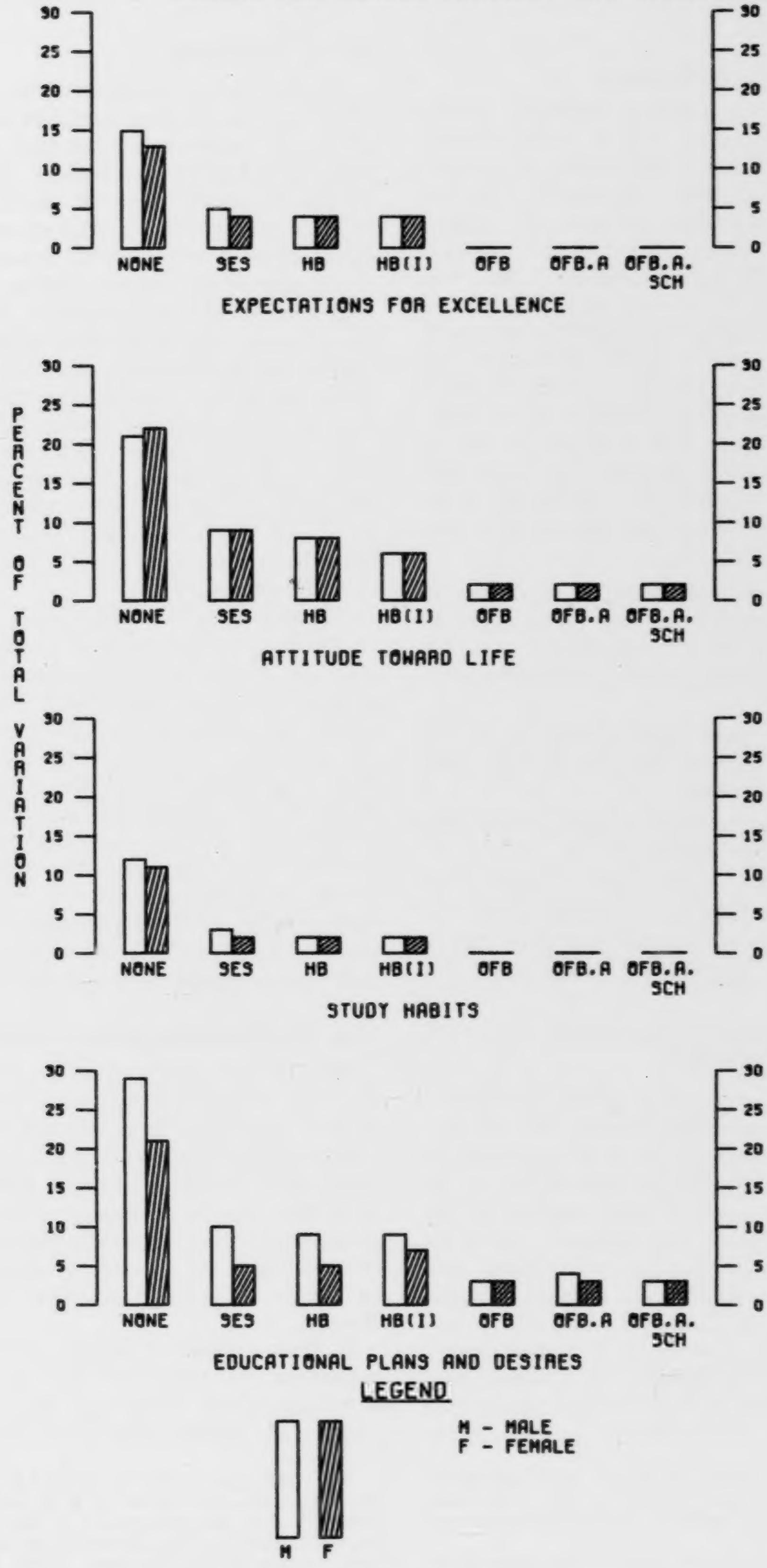
[5] The general computational rationale used is for the squared multiple correlation of the set of variables being taken into account to be subtracted from that obtained when all variables are entered into the regression.

FIGURE 10.3. - PERCENT OF TOTAL VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY EACH FAMILY PROCESS MEASURE INDEPENDENT OF OTHER FAMILY BACKGROUND AND SCHOOL FACTORS. 9TH GRADE STUDENTS



10.3 (43a)

in their HB, including RETH, have been taken into account. A relationship of both ATTUD and EDPLN with ACHV persists even after allowance has been made for all the other variables.

### 10.1.3. School Variables and Achievement

The last analysis that we choose to highlight is concerned with the relationship of school variables with ACHV both before and after various aspects of the student's background have been taken into account. We saw in chapter 9 that our most meaningful basis of comparison for studying possible school influences was when all groups were included in the same framework. This was because, when the groups were kept separate, it was impossible to discern the highly systematic relationship between the socioeconomic and racial-ethnic composition of the student body, on the one hand, and the attributes of the teaching staff, on the other. Accordingly, our summary analyses, given in figure 10.4, present, for all the groups in the same framework, an analysis of the relationship of a set of school variables with ACHV after different background conditions have been taken into account.[6] These conditions are:

*NONE*: This is the percentage of variation in ACHV accounted for by SCH, which is our set of 10 school variables—five teacher attributes and five attributes of the student body's achievement-motivational mix.

*SES*: This is the percentage accounted for by SCH after differences among students in their SES have been taken into account.

*HB*: This is the percentage obtained after SES and FSS have both been accounted for.

*HB(I)*: This is the percentage obtained after HB, including RETH, has been accounted for.

*FB*: This is the percentage obtained after HB(I) and the four PRCS variables have been accounted for.

*FB, A*: This is the percentage obtained after FB and A have been accounted for.

Figure 10.4 shows that there is a 3 percent sex difference that vanishes as soon as SES is taken into account. The most salient trend, however, is for the percentage of variation accounted for by SCH to get smaller in an almost progressive manner, as different aspects of the student's background are taken into account.[7] After all the variables we had at our disposal were taken into account the role of SCH in ACHV was reduced to about 4 percent of the total. It appears, then, that this is another way of observing the dependence of school-related factors on the student's family background. However, this kind of analysis does not allow us to depict the confounding and possible interplay of these different sets as clearly as one that shows what might have resulted if the variables had been entered in a different sequence (our commonality technique, of course, does precisely this).

### 10.1.4. Conclusion

On the basis of these analyses we are inclined to conclude that family structure has both direct and indirect effects on achievement, but that its *relative* strength is different for each racial-ethnic group. For Negroes and whites, the direct effect of family structure on achievement is very small. For the other groups, however, this direct effect is considerably greater. Moreover, for each of the groups the indirect effects of family structure on achievement are much greater than the direct effects. There is also a considerable attitudinal and motivational element in achievement here that is independent of the combined effects of Socio-Economic Status, Family Structure, and Racial-Ethnic Group Membership. These results suggest that it is not so much the mere presence or absence of key family members that makes a difference in the child's level of achievement as it is the expectations and aspirations that parents and parental surrogates have for him or her and the supporting activities in which they engage.

We also suggested that family background and school factors might be related both to each other and to achievement in yet another way. The influence of these school factors, we conjectured, might run somewhat as follows. First, the achievement and motivational mix of the entering students might set the "going rate" or acceptable level of performance for the students. Once established, this level of performance would have an effect on the achievement level of each student independently of his own family background. The influence of the teachers would be manifested, for the most part, through this "going rate." In the next section, we shall discuss some ways of breaking this dependence of an individual student's achievement on that of his peers.

## 10.2. COMPARISON WITH PREVIOUS STUDIES

How do the results of this study compare with those of other studies in the same area? In attempting to answer this question we do not propose to carry out a comprehensive review of the literature. For this a separate work would be needed.[8] What we plan to do here is to draw on the results of a few studies, mostly large scale, that permit especially pertinent comparisons with our results. First we shall examine some studies related to family influences, and then some related to school factors.

In their review of studies of social class and family influences, W. Brookover and D. Gottlieb (in Charters and Gage, 1963) noted that many studies have assumed social class membership to be the primary explanatory

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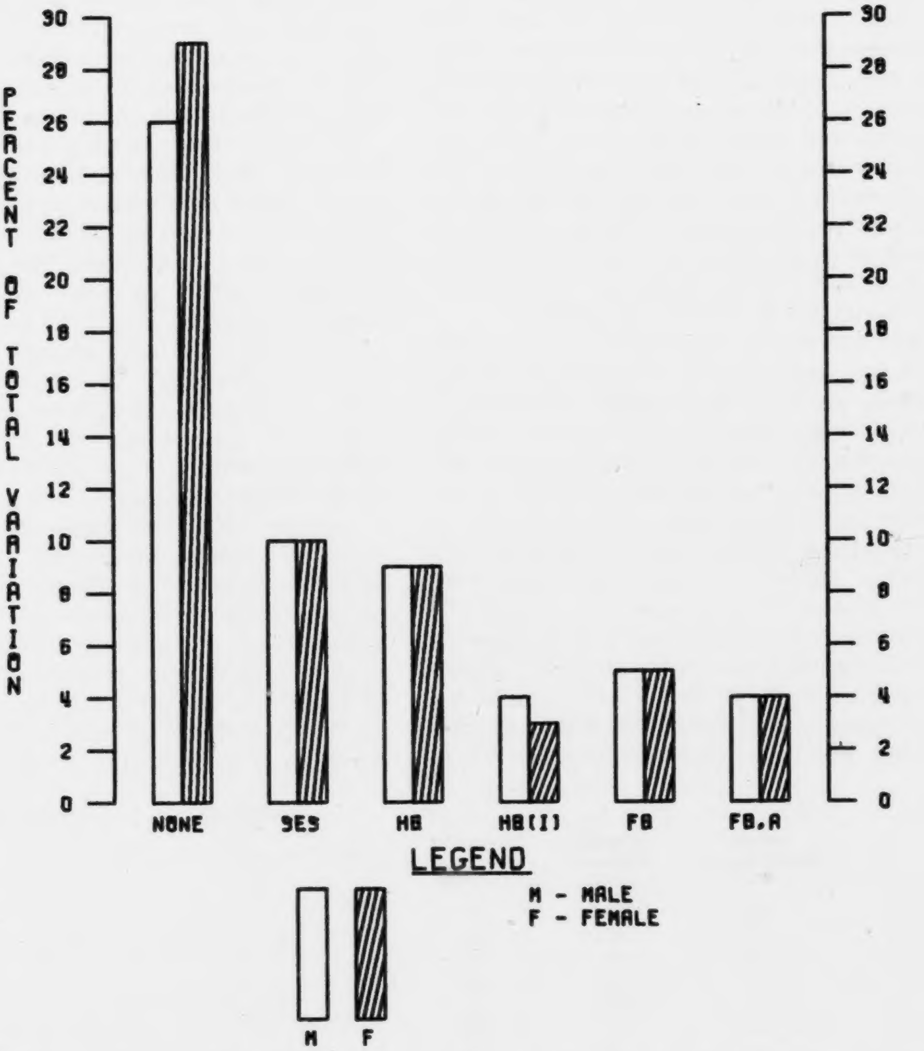
[6] These analyses use the approximately 64,000 male and 64,000 female 9th-grade students. The numbers presented differ from those given in chapter 9 since there is a reduced number of students and the sexes are kept separate.

[7] The slight increment in moving from HB(I) to FB is due to the interaction of HB(I) and PRCS with SCH.

[8] Meanwhile, the reader is referred to the reviews of the literature on school achievement by J. R. Lyle (1967) and H. S. Dyer (1968), and to the publications of the American Educational Research Association. The literature on desegregation research has been reviewed by M. Weinberg (1970), and that on social factors in learning by S. S. Boocock (1966).

FIGURE 10.4. - PERCENT OF TOTAL VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY SCHOOL FACTORS INDEPENDENT OF FAMILY BACKGROUND, 9TH GRADE STUDENTS



variable in studying educational aspirations and achievement, and that once the relationship with social class has been established no further explanation need be sought. However, as Brookover and Gottlieb point out, there are many factors in addition to social class membership that should be taken into account.

It was precisely these kinds of consideration that we had in mind when embarking upon the present study. In particular, our curiosity was piqued by Daniel P. Moynihan's observations that the relationship of Negro family structure with achievement was small while the incidence of Negro family disruption (especially father absence) was relatively high (Moynihan, 1968). Since one might expect that a high incidence of family disruption would have detrimental effects on achievement, we set out to learn how and why this expectation was not always fulfilled. We therefore examined the relationship between family structure and achievement for each racial-ethnic group on which we had the necessary data. We found that this relationship was surprisingly small for whites and Negroes even though their incidence of father absence was very different. For Indian Americans and Puerto Ricans, however, the relationship was somewhat larger although still not pronounced. The relationship was largest of all, although far from pronounced, for Mexican- and Oriental-Americans. We do not have a ready explanation for these differences. Clearly, other aspects of the family also need to be considered.

Another study, admittedly rather limited in the number of students covered, did find a relationship of father absence with achievement (Sutton-Smith et al., 1968). However, it also found that this relationship was moderated by the number and sex of one's siblings as well as by one's age during the period of father's absence. Thus a boy with a brother was less affected than one who had only sisters.

We might even go further and suggest that the presence of a variety of others in the life space of a child might also play a role in his achievement. But is the significant consideration the mere presence or absence of others, or is it their involvement with the child in specific ways? One investigation strongly suggests the latter (Hess and Shipman, 1965). In any case, when we addressed this question we were interested in the differences among students within each group as well as in the differences among the groups. Looking at the group averages for socioeconomic status and family structure we noted that groups with high scores on one were also high on the other, and groups with low scores on one were low on the other. In other words, socioeconomic status and family structure, as well as membership in a particular racial-ethnic group, were related phenomena and their effects on achievement would not be readily separable.

For this reason, and because there was a considerable dependence of family structure on socioeconomic status within each group, we chose to consider the student's family structure, with his family's socioeconomic status, as representing his family's social structural aspects. We also included racial-ethnic group membership, since it was strongly dependent on these two factors. All these factors together were called the student's Home Background (HB). When socioeconomic status and family structure were pitted against the more behavioral aspects of family life, such as the expectations and aspirations that the parents have for their children and the activities that they engage in to support these aspirations—that is, the aspects we called Family Process—we observed the following percentages for each group as these factors related to achievement:

| Group | Home Background | Family Process | Shared in Common |
|---|---|---|---|
| Indian American | 14 | 43 | 43 |
| Mexican-American | 17 | 39 | 44 |
| Puerto Rican | 5 | 55 | 40 |
| Negro | 20 | 45 | 35 |
| Oriental-American | 8 | 49 | 43 |
| White | 10 | 43 | 47 |
| All Students | 20 | 28 | 52 |
| All Students(I) | 29 | 23 | 48 |

NOTE.—Figures are unitized commonality coefficients that express the percentage of ACHV attributable to each column variable.

We can see from this table that a greater percentage role in ACHV is played by PRCS than by HB, except when students from all the different groups are placed in the same framework and their racial-ethnic group membership is considered as an aspect of HB(I). For this latter case—i.e., All Students(I)—the percentage for HB exceeds that for PRCS by about 6 percent.

We should not overlook the percentages that are common to these two sets, for they show that the intact families from the higher socioeconomic strata are far more likely to have these process-type activities than the less intact families from the lower socioeconomic strata. This is true for each group as well as for all groups combined and for the adjustment known as All Students(I).[9]

How then do these results compare with those from other studies? A study of English children from the time of their infancy through what we might term their junior high school years showed that parental aspirations for the child, and involvement with him in support of his school performance (for instance, if the father conferred with the teachers about his school work), was one of the largest influences on achievement, independently of social class membership, housing conditions, and family size (Douglas, 1964). Indeed, if a child's mother wanted her son to pursue an academic curriculum, then he was more likely to do so than one would expect merely on the basis of his ability. In addition, this parental interest had a cumulative effect on achievement measured over the 3-year span from ages 8 to 11. These findings, which, since England is more racially homogeneous than the United States, might be compared with our results for whites, and are in line with our results despite certain differences in study design—for instance, we did not follow individual students over a number of years, nor did we obtain information from their parents about them.

Another study, although smaller in magnitude and scope, did obtain information from parents concerning verbal development and learning experiences in the home, parental emphasis on academic achievement, and so forth (Wolf, 1964). Such family process variables were found to play a large role in academic achievement independently of the child's measured intelligence. Placing Wolf's data in our framework of unique and common percentages, we obtained the following results:

| Intelligence | Family Process | Shared in Common |
|---|---|---|
| 16 | 24 | 60 |

NOTE.—Figures are unitized commonality coefficients (squared multiple correlation 76 percent) that express the percentage of ACHV attributable to each variable.

From these percentages we can see that the contribution of Family Process to Achievement is about one and one-half times greater than that of tested intelligence; in fact, the latter might better be regarded as a measure of learning. The large percentage in common to the two sets of variables shows that there is a very pronounced tendency for parents of children who score high on the intelligence test to involve themselves in the activities that we have called Family Process, and that both translate into academic achievement. These results indicate that Family Process figures importantly in achievement beyond what one would expect on the basis of intelligence. If we think of Family Process as occurring from a very early time in the child's life, then we may recognize that it can also play a role in the development of measured intelligence. The role of such early childhood factors in the development of intelligence has been commented on extensively by J. McV. Hunt (1969).

A comprehensive national study of English schoolchildren, comparable to the Coleman Report, showed that variation among parents in their attitudes toward and aspirations for the child played a much greater role in the child's achievement than did the school or the parents' material circumstances (Plowden et al., 1967). This may be due to greater homogeneity in the material circumstances of English parents. If such conditions were to prevail in the United States, the role of Family Process in Achievement might be even greater. Could it be that if the physical and social well-being of the other ethnic groups were to approach that of the whites, then the type of analysis that we have labeled All Students (I) would show a diminished role for Home Background and an increased role for Family Process?

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[9] That is, when Racial-Ethnic Group Membership is considered as an aspect of Home Background.

A followup study of ninth-grade boys by J. G. Bachman (1970) showed that some of the kinds of things we have called Home Background, as well as some that we have called Family Process, played large roles in Achievement independently of tested intelligence, as well as in a variety of other outcomes such as self-concept, educational plans, and incidence of delinquent behavior. A strong relationship, independent of social class membership, between parental encouragement and the child's educational aspirations, has also been noted (Sewell and Shah, 1968). The role of what we have called Home Background (primarily socioeconomic status) has also been explored, but without the use of family process measures (Shaycoft, 1967; Husén, 1967).

On the basis of this very cursory survey of the literature we feel there is a firm basis for concluding that Family Process figures no less importantly in Achievement than social class membership. More generally, the attitudes and motivation of the student, with their antecedents and concomitants in his family life, figure as importantly in his achievement as his family's position in society.

But how, we may ask, does the school figure in these possible effects? We are asking here about the differential effects of schools versus the differential effects of families, not about the effects of attending school rather than not attending it. There are, however, two studies that do illuminate the latter. A study of Negro children in Prince Edward County, Virginia, where the schools were closed for several years, found that children who had never attended school could not even hold a pencil, let alone follow detailed instructions or take a test (Green et al., 1964). The test performance of children whose schooling had been interrupted was compared with that of Negro children in a neighboring county who were of similar socioeconomic and rural background. It was found that the children whose schooling had been interrupted exhibited severe educational retardation, particularly on tests more closely related to school curricula such as spelling and arithmetic. On an intelligence test the scores of these children were 15 to 30 points lower than those of the children in the adjacent county who had continued in school.

A second such study dealt with out-of-school versus in-school effects. This study compared the rates of growth in reading and word knowledge of poor Negroes and middle class whites during the school year and during summer vacation (Hayes and Grether, 1969). It found that the middle class whites continued to improve their rates during the summer vacation, while the poor Negroes either failed to improve or got worse. This suggests that school experience may be more critical in the achievement of poor than of middle class children.

Clearly all schools may be considered as having important influences on their students. But whether some schools are more effective than others, and to what extent, is another matter entirely. In addressing the differential effectiveness of families versus schools we found that the role of what we called Family Background—that is, Home Background and Family Process combined—was almost five times greater than that of a wide variety of school factors. We did, however, note a large portion that was common to both Family Background and the school, as they related to achievement. We therefore concluded that there was a great deal of confounding and interplay of family background and school influences. When we examined Home Background and Family Process to see which one might be playing the greater role in achievement along with the school factors, we found that the independent role of Family Process exceeded the roles of Home Background *and* the school factors. Such results are similar to those obtained by Plowden (1967). In our results, however, we noted a great deal of confounding of home background and school factors. This was due, in part, to the pronounced aggregation of students into schools on the basis of Home Background (including Racial-Ethnic Group Membership), which in turn is correlated with achievement levels at entry. The confounding effect can also be traced to a systematic relationship between such attributes of the teaching staff as: verbal skills; racial-ethnic group membership; view of teaching conditions; preference for working with students of different ability levels; salary and training levels; and the socioeconomic, racial-ethnic, and achievement composition of the student body. *This kind of a relationship between students and teachers existed even at the first grade,* before the schools had had much of an opportunity to influence their students (Mayeske et al., 1969). It was not, however, as pronounced a relationship as at the higher grade levels, as one would expect. Elsewhere we have called this phenomenon the *ecological-functional dilemma* (Mayeske, 1970). By this we mean that we cannot readily separate the effects of the schools' resources from the manner in which they are allocated between schools.

Despite these difficulties, the relationships that we have been able to uncover can be shown to have parallels in other studies. For example, we found that the role of school factors in achievement that were independent of Home Background and Family Process accounted for about 5 percent of the *total* differences among students in their achievement. But we also found that the most salient variables were the achievement-motivational mix of the students and the five teacher attributes already mentioned. We conjectured that these characteristics of the student body set the "going rate" for individual student achievement, and that through this rate, for the most part, the influence of school resources, especially teachers, made itself felt. J. W. B. Douglas (1964) found a parallel to this when he noted that if a student attended a school that had a high proportion of students going on to take academic courses then he, too, would be more likely to go on to such a curriculum—more so, in fact, than one would expect on the basis of his test results. The same study found that teachers played an important role in the proportion who went on to what the English call grammar schools, which can be roughly described in American terms as nonvocational high schools. Of course, our results closely parallel those of Coleman and his associates (1966), even though many of our procedures differed considerably from his.

On the basis of these results we are inclined to conclude that of all the school's different aspects, the most important one for achievement is the kinds of students one goes to school with. The influence of the school's resources, primarily the teachers, is manifested in conjunction with these characteristics of the student body. Conceivably, this could be a universal phenomenon. That is, if the achievement levels of entering students were independent of Family Background we still might expect the same phenomenon to arise merely because students were allocated to schools on the basis of these achievement levels. Of course it is not realistic to assume that Achievement will ever be independent of Family Background. Indeed, we would be more inclined to argue that the more comprehensive one's data are on all aspects of a student's family background, the more likely it is that there will be considerable confounding and interplay of family background and school influences on achievement, and less of an independent effect of either than we have observed in this study. This would not necessarily be an indictment of the schools: we are more interested in the outcomes of schooling than in the procedures by which they are attained. For example, if learning styles and needs are a function of family background, and the schools are able to match individual student learning styles with school resources in such a way that the outcomes of schooling are more nearly equal for poor children, then we would not be unhappy with this result. It is the fact that school outcomes are so disparate for the different socioeconomic and racial-ethnic groups that has led us to question the procedures by which these outcomes arise. Examination of the procedures discloses that they reflect inequities imposed by society at large, at least as of 1965, by virtue of one's social class and racial-ethnic group membership.

## 10.3. FAMILY BACKGROUND OR SCHOOL FACTORS?

In figure 10.5 we have diagrammed the results of our experience to date in attempting to illuminate the determinants of student achievement. We conceive the different aspects of the student's home background as in a state of mutual interaction. For example, because of social practices in the United States that resemble a caste structure based on skin color, the racial-ethnic group to which a student's family belongs will affect their socioeconomic status, which will in turn affect family structure. Family structure may in turn serve to affect socioeconomic status (e.g., there may be an extended family with several wage earners, father absence with or without child support payments, etc.). We conceive each of the aspects of family process in a similar manner. For a school, we feel that the student body's achievement-motivational mix affects the kinds of resources the school is likely to have and the manner in which they are made available. For example, if a school has a high proportion of high-achieving, college-bound students, we may find that teachers who like to work with students of this kind seek out schools where they are to be found. Alternatively, if a school has a high proportion of very low-achieving students we may find a large number of remedial reading teachers, and so forth.

The arrows in figure 10.5 indicate whether each of these classes of variables has a one-way or two-way relationship with the others. For example, we conceive Home Background as partly but not wholly affecting the kind of school a student attends, the kinds of activities his parents engage in with him, and his outlook on life. We also conceive his home background as having a direct effect on his achievement, independently of the school and family process variables. It is this direct effect that indicates the advantages or disadvantages that accrue from one's class membership and family structure. Thus if we regard the total differences among students in their achievement as being completely explained by these three classes of variables, then there is 5 percent that is directly attributable to Home Background. We shall have more to say in a moment concerning the effect of Home Background that may be shared with the other two classes.

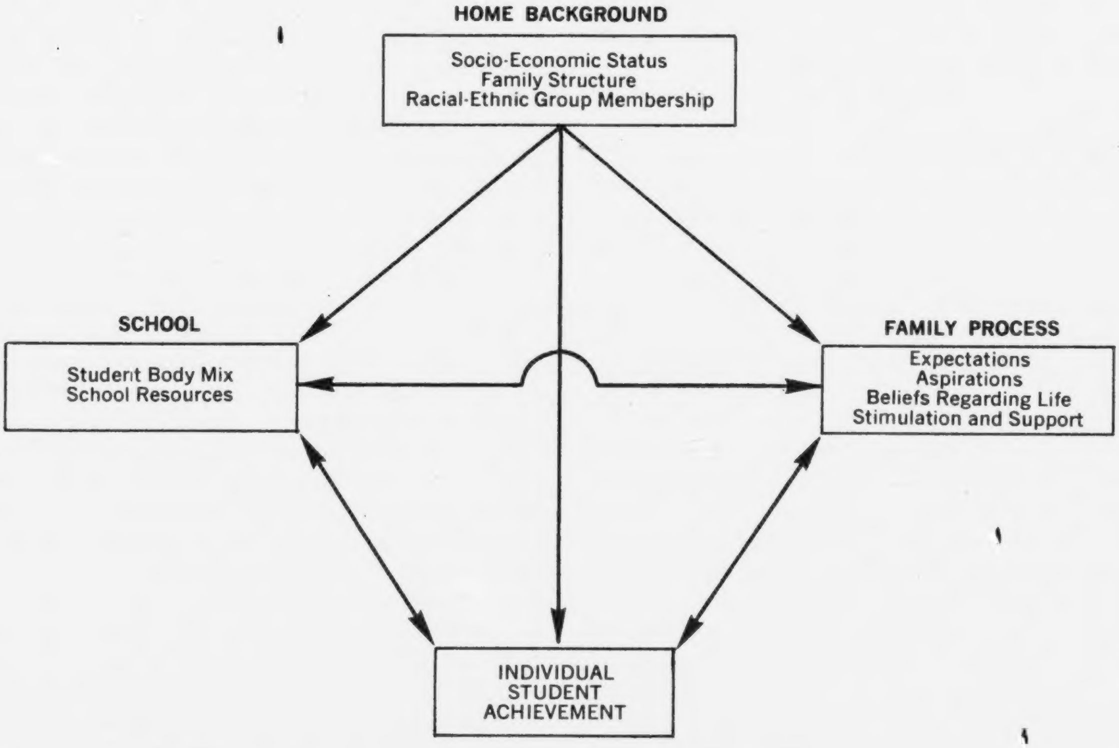
The school and family process sets have two-way arrows to indicate that they can be mutually influential both on individual student achievement and with respect to each other. For example, interactions of the parents with the teachers involve all three classes of variables. However, we tend to think of these interactions as altering the teacher's or parent's behavior but not Home Background. The school variables and the family process variables each have an effect on achievement that is independent of all the others. Again, if the three sets together explain 100 percent, then the percentage that is unique to Family Process is 22, while 10 percent is unique to the school set and 5 percent to Home Background. This leaves 63 percent to be explained by different combinations of the sets, as follows:

| | |
|---|---|
| Home Background and Family Process | .21 |
| Home Background and School | .21 |
| Family Process and School | 0 |
| Home Background, Family Process, and School | .21 |

These latter percentages reflect the extent to which these sets of variables are inextricably intertwined in their effects on achievement. In more technical language, the percentages are unitized commonalities from a commonality analysis that uses Home Background as one set, Family Process as the second set, and the set of five student body and five teacher variables, described in previous sections, as the third set.

All these figures reflect, at least in part, the effects of the particular ways in which we, as a society, have organized our lives, and the effects of these preferences

FIGURE 10.5.—The Roles of Family Background and School Factors in Achievement



on our school system. A different way of organizing our lives or our schools could yield percentages very different from the ones shown here, and might even change the nature of the variables we have used to describe home background. Nevertheless, we feel that the kinds of things we have called Family Process will always loom large in the understanding of achievement.[10]

### 10.3.1. The Family as Teacher

This study has demonstrated that family background plays a profound role in the development of achievement, not only through the social and economic well-being of the family but through the values its members hold with regard to education, and the activities that parents and parental surrogates engage in with their children to make these values operational. For whites we saw that such values and activities outweighed social and economic well-being as a factor in achievement. Analyses for other ethnic groups, however, showed that their depressed social and economic well-being, relative to that of whites, had detrimental effects on achievement, and that these effects were more difficult to overcome through what we called "educationally related child-rearing practices." For all groups, however, the role of these practices that was independent of social class membership (broadly defined) was large enough to indicate that the educational functions of the family were a powerful force that could be harnessed to increase the effectiveness of the schools.

How might this be done? The family, it appears, performs at least two major and interrelated sets of educational functions, one a teaching function and the other a motivational one. We suggest that the family is more skilled in and conscious of the latter set. Among the motivational functions are supportiveness, follow-through activities, and the provision of performance incentives. An example of supportiveness would be when the child has a teacher that he dislikes very much, and the parents try to sustain his enthusiasm for school. Follow-through activities are when parents do such things as keep the television off until homework is done. Receptivity to family and school administered incentives, such as verbal praise, is instilled at a very early age, when the child is rewarded with affection for doing tasks well. Also, through interaction with the parents, the child may come to think of himself as one for whom learning is important. Indeed, he may develop ways of sustaining his own motivation by rewarding his own behavior.

The teaching functions of the family, although not separate from its motivational functions, are not, as we suggested, so consciously practiced. Usually, the level and sequencing of verbal interchanges among parents, as well as between parent and child, compose the *unconscious curriculum* that can enhance the child's school performance (Hess, 1969). Such things as reading to the child before he starts school, we observed, were related to the child's later school performance. Indeed, the family seems particularly well suited to perform these early teaching functions, and many individual families might well be encouraged to do more in this line. It is doubtful, however, that many families consciously engage in the development of concepts in their children, however simple the task may be (Orhan and Radin, 1969).

---

[10] We have not entered into considerations of inherent ability in figure 10.5 because all we have are measures of demonstrated ability. These latter measures, of course, have large social determinants. It seems axiomatic that the more similar are two individuals' environments the more likely it is that their differences in achievement stem from inherent causes.

### 10.3.2. Education for Child Rearing

How, we may ask, are the schools involved in all this? The answer is that the way in which parents rear their children is important not only for the child's school performance but for his emotional well-being. Further, one may question the extent to which practical information concerning many aspects of child care is provided to present and future parents at either the college or high school level. The schools, then, could provide education for more effective child rearing.

There are at least four current approaches to effectiveness training for parents, and a number of communities are using one or more of them (T. Gordon, 1970; Niedermayer, 1969; I. Gordon, 1969; Scheinfeld, 1969). In addition, the issues and techniques in education for child rearing have been outlined by Orville G. Brim, Jr. (1959).

Short of a full-blown curriculum for child rearing, E. Gordon (1970) has noted that the mere involvement of the parents in the child's schooling may serve to enhance his performance in a number of ways. Thus it may make the child more visible to the school personnel and indicate both to them and the child that educational values are upheld by the family. Also, parental participation may change the attitude of parents toward the school and its goals and allow them to acquire certain teaching skills that can then be applied at home.

But under what conditions are parents likely to engage in educationally related child-rearing activities? A study by J. M. Garza (1969) suggests that when parents perceive opportunities for their child to obtain a better life through education then they will be more prone to engage in such activities. These in turn translate into motivation for achievement. Given that a better life *is* possible through education, then schools can provide information to parents concerning ways in which they can improve their effectiveness. The traditional classroom should not be conceived of as the sole medium through which this might be accomplished. A variety of other media such as TV, radio group discussions in the home, mobile classrooms, and so forth could also be utilized. All parents, we have argued, not just nonwhites, could benefit from such information.

If these are things that the schools can do to increase the joint educational influence of the school and the family, what then can the schools do to increase their own educational influence? It will be recalled from our earlier discussions that the most salient aspect of the school for individual student achievement was the achievement-motivational mix of the student body. How can the schools break the influence of the "going rate" for achievement? This could involve either lessening the dependence of a child's learning rate on that of his peers or increasing the rate for the entire group. Admittedly, we do not yet know how to do either, but a number of approaches are being tried and others are awaiting trial.

How, then, should such trials be designed? In a previous study we argued that educational objectives had to be precisely specified and periodically assessed if educational programs were to be effective (Mayeske et al., 1969). But there are difficulties in deciding what yardsticks should be applied. Should we emphasize what a student has learned relative to what others have learned or relative to where we would like all students to be at a particular stage in their development? The latter alternative would imply that we have certain minimal skill levels for different stages and that we can assess the nature of a student's status with respect to these levels. But this also implies a great deal of consensus among educators—consensus that does not now exist. Nevertheless, we believe such an approach would put the emphasis more where it belongs, namely, on what a student has learned relative to a fixed standard of performance rather than relative to other students. Of course, we would still be interested in how a student performed relative to others. But this would not receive primary emphasis (for this dual approach see Klein, 1970).

In earlier work as well as in this study we observed that both the organization and functioning of schools are strongly affected by the socioeconomic and racial-ethnic composition of their students (Mayeske et al., 1969). On the basis of these results we suggested that the educational influence of the schools would be increased if their organization were made less dependent upon their students' social background. Such changes are currently taking place through school desegregation efforts. It might be desirable to know whether there is an optimal mix of student body characteristics that would enhance the probability that a variety of school outcomes might occur. For example, with regard to a single attribute such as achievement, is there an optimal mix of student characteristics, at either the school or classroom level, such that the achievement of each individual student would be enhanced? It seems likely that there would be an optimal mix or a possible range of mixes. However, answers to these questions would require large-scale experimentation and caution would have to be exercised in order to avoid the undesirable effects of many tracking systems (Douglas, 1964; Schafer et al., 1970).

Another attractive possibility for altering learning rates is the individualization of instruction. There are a variety of approaches to individualization—ungraded schools, individually prescribed instruction, the use of contracts, and so forth—and many are currently being tested. Most of these approaches attempt to make a child's progress depend upon his own learning rate rather than that of his peers. Such an approach if adopted schoolwide can have considerable implications for the nature of pupil-teacher interaction, the grade structure, and other aspects of school organization. These approaches also have the desirable property that the yardsticks of progress are built into the program and are as it were geared to the child's mastery of a particular content area.

Another class of approaches to altering learning rates introduces competition into the school system by providing incentives for teachers and students based upon their performance, or by providing individuals with a choice of schools they may attend (Clark, 1967; Coleman, 1968; Fantini, 1971). Although these approaches still await proper trial, experiments are being done on a modified form of competition known as performance contracting. Under this approach the school system contracts out certain teaching functions, usually remedial in nature, and the contractor is paid according to the results produced. It is too early to say just what kinds of returns may be realized from this approach, but it has collected a considerable following of enthusiastic supporters. However, the preliminary efforts do not encourage a sense of optimism for its future (Carpenter and Hall, 1971; Ray et al., 1972).

Yet another approach, based upon the premise that institutional change must occur before we can expect individual change, focuses on community development, perhaps coupled with community control of the schools. E. Lurie (1970) has recently summarized her extensive experience in this area.

It is clear that there are a variety of approaches by which the educational influence of schools might be enhanced. They all need to be tried out, and some are further along in this respect than others. In this regard, our earlier conclusions still appear to hold good: there does not appear to be any single approach, as of this writing, by which we can transform the achievement levels of large proportions of poor children so that they may overtake in a few years their more advantaged counterparts. However, the fact that solutions are not forthcoming now does not mean that they will never be forthcoming. Rather, it appears that the task is more difficult than when first envisioned.

In sum, what many of these analyses have shown, we believe, is that the schools reflect a deep-seated social problem that permeates almost every aspect of our society. This problem, in the main, is that a child's birth into a particular stratum of our social structure largely determines where he will and will not end up in the scheme of things. The problem is more than one of birth, however, because one's skin color and language habits tend to be associated with one's position in this social structure. It does not seem that the schools alone can rectify this problem, although they may play an ameliorative role. It seems more likely that the problem warrants a concerted attack in many different sectors of society (viz, jobs, housing, schooling, etc.). Given that a concerted effort is warranted, we have attempted in the preceding paragraphs to outline just a few things that the educational sector might do to help ameliorate the problem.

## 10.4. SUMMARY

In this chapter we first reviewed several highlights of our study. Among these were the findings that:

1. For Negroes and whites there is very little relationship of Family Structure and Stability with Achievement, even though the rate of father absence for Negroes was among the highest and that for whites was among the lowest.

2. When Family Background, Area of Residence, and various aspects of the school attended were taken into account, the degree of variation in Achievement that could be attributed to Racial-Ethnic Group Membership dropped to 1 percent or less.

3. There were indications that the color-caste aspects of the social structure, as represented by Racial-Ethnic Group Membership, had a greater impact on Achievement in the South, and would consequently be more difficult to overcome there by by means of educationally related child-rearing activities.

4. Of the variables in the Family Process set, the ones with the largest relationships with Achievement were Educational Plans and Desires, and Attitude Toward Life. Both relationships persisted even after all the other variables had been taken into account.

5. The role of school-related variables in Achievement, after all the other variables had been taken into account, was only about 4 percent. In other words, all school-related factors depended greatly on the student's family background.

We went on to conclude that it was not so much the mere presence or absence of key family members that affected a child's achievement level as it was the expectations and aspirations that parents or parental surrogates had for the child and the supporting activities in which they engaged. However, we also found that a child's educational performance was greatly affected by the "going rate," or standard of performance set by his schoolmates.

We then compared the results of our study with those of similar studies and found that, on the whole, they supported our emphasis on the family process variables, though there were some cross-cultural differences. We concluded that, in general, Family Process plays as important a role in Achievement as Socio-Economic Status. Moreover, we found that there is a great deal of interplay between Family Background and school influences, though Family Process still plays a greater role than any set of school factors. Naturally, allocation of students to schools on the basis of Home Background (including Racial-Ethnic Group Membership) had a great deal to do with this. In fact, of all school factors, the one most important for Achievement was the composition of the student body. Thus, despite the profound influence of the family, a different way of allocating children to schools might well produce different educational results.

Among the remedial measures that might be undertaken we suggested programs, run by the schools, to instruct parents on the importance of educationally related child-rearing activities in the home. As for the schools, we felt that their main need was to break the influence of the "going rate" on achievement levels. One problem here is that there is no consensus among educators about what level a child should have reached at each stage. But in any case the educational influence of the schools might be increased if their organization were made less dependent upon the students' social background. In addition to changing the composition of the student body, individualizing instruction would appear to be a promising approach. Also briefly reviewed were so-called performance contracting and community development.

Although all these approaches can and must be tried, no single approach at present appears likely to transform the achievement levels of large portions of poor children. However, we believe we have succeeded in demonstrating the extreme seriousness of the social problem reflected in our schools. The fact that the schools alone cannot solve this problem should provide justification for a concerted attack on it in many different sectors of society.

# APPENDIX A

## THE DATA-ANALYSIS MODEL

The following logical steps were incorporated into our computer program:

**Item Analyses.** Each questionnaire item was analyzed against one or more variables of interest. In this way we were able to use not only the percentage of respondents choosing each item but also their average on the variables of interest as a guide in assigning scale values. We did the same with the nonrespondents. For the student questionnaire, item responses were analyzed against an achievement composite.[1] For the teacher questionnaire, item responses were analyzed against the number of items that were answered correctly on the teacher's vocabulary test.[2] Responses to the school principal questionnaire were analyzed against the principal's response to questions concerned with his annual salary, number of students enrolled in his school, the rural, suburban, or urban location of the school, and the proportion of children in the school from working-class families.[3]

**Coding and Intercorrelation of Variables.** An approximately 10-percent sample of students was drawn from the student master tapes at each grade level. The variables were then coded and intercorrelated.[4] For the teachers and principals a breakdown into elementary and secondary was made, and correlations computed for each breakdown. The full number of teachers and principals included in the survey was used in these analyses.

**Reduction of Variables Into Indices.** The intercorrelation matrices for the above steps were subjected to a series of factor analyses in order to obtain meaningful groupings of the variables, called indices.[5]

**Computation of Index Scores.** The weights obtained from the factor analyses were used to compute index scores first, by standardizing each variable to a mean of zero and a standard deviation of one; then, by multiplying each variable by its respective weight; and finally, by summing these values. In this step index scores were computed for all of the students included in the survey. Index means, standard deviations, and intercorrelations were also computed.[6]

**Computation of School Averages.** The mean score for each school was computed for both students and teachers on the indices and variables that were carried along separately.

**Merging of School Data.** The school means for students and teachers were merged with the school data for principals on a single tape (one tape for each of the five grade levels).

**Computation of Correlations and Regressions.** We performed a large number of statistical analyses in order to interrelate the variables. The primary statistical tools used were regression analysis and partition of multiple correlation.

Ideally, we would have liked to study these responses for the same students as they progressed through their years of schooling. However, as explained in chapter 1, we decided to use cross-sectional data; viz, we collected them from students at different grade levels at one point in time. Consequently, whenever we made inferences about trends over time we did so with great caution.

### A.1. THE DATA-ANALYSIS MODEL AND ITS PROPERTIES

The data for this study were obtained by appending to each student the attributes of his school appropriate for his grade level, as they were developed in the School Study. This procedure generates a data matrix that can be compared with the following hypothetical one:

$$
\begin{array}{ll|ccccc|}
 & & 1 & 2 & 3 & 4 & 5 \\
 & & \mathrm{SES} & \mathrm{ACHV} & \overline{\mathrm{SES}} & \overline{\mathrm{ACHV}} & \mathrm{PTR} \\
\hline
 & 1 & \mathrm{SES}_{1A} & \mathrm{ACHV}_{1A} & \overline{\mathrm{SES}}_{A} & \overline{\mathrm{ACHV}}_{A} & \mathrm{PTR}_{A} \\
 & 2 & \mathrm{SES}_{2B} & \mathrm{ACHV}_{2B} & \overline{\mathrm{SES}}_{B} & \overline{\mathrm{ACHV}}_{B} & \mathrm{PTR}_{B} \\
\mathrm{STUDENTS} & 3 & \mathrm{SES}_{3C} & \mathrm{ACHV}_{3C} & \overline{\mathrm{SES}}_{C} & \overline{\mathrm{ACHV}}_{C} & \mathrm{PTR}_{C} \\
 & 4 & \bullet & \bullet & \bullet & \bullet & \bullet \\
 & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \\
 & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \\
 & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \\
 & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \\
 & \mathrm{N} & \bullet & \bullet & \bullet & \bullet & \bullet \\
\hline
\end{array}
$$

In this matrix the individual student, as represented by the numbered rows from 1 to *N*, is the basic unit of observation. The five columns of the matrix represent different kinds of variables. The first two columns contain observations on each student's Socio-Economic Status (SES) and Achievement (ACHV), respectively. The third and fourth columns contain the average Socio-Economic Status ($\overline{\text{SES}}$) and average Achievement ($\overline{\text{ACHV}}$) of students in the same school and grade level as the individual student. The last column contains a more traditional school variable, the Pupil-Teacher Ratio (PTR) for students of the same school and grade level. The alphabetical subscripts (A, B, C, etc.) are used to designate the schools.

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[1] Mayeske et al., 1968b.

[2] Mayeske et al., 1967.

[3] Mayeske et al., 1968a.

[4] The codes used for these analyses, as well as the means, standard deviations, and intercorrelations for the students, teachers, and principals, are given in the appendixes of the School Study (Mayeske et al., 1969). The student items were coded by means of criterion scaling.

[5] Principal components analyses were used, with varimax rotations of components having a root of one or more.

[6] The items and weights used in forming these indices are given in the Technical Supplement, available from the senior author at the U.S. Office of Education, 400 Maryland Ave., SW., Washington, D.C. 20202.

When these variables are intercorrelated the values for each individual student enter into the computational formula.[7] They result in the following hypothetical correlation matrix:

STUDENT CORRELATIONS

| | 1<br>SES | 2<br>ACHV | 3<br>$\overline{\text{SES}}$ | 4<br>$\overline{\text{ACHV}}$ | 5<br>PTR | |
|---|---|---|---|---|---|---|
| 1. SES | 1.00 | $r_{12}$ | $r_{13}$ | $r_{14}$ | $r_{15}$ | STUDENT-SCHOOL CORRELATIONS |
| 2. ACHV | $r_{12}$ | 1.00 | $r_{23}$ | $r_{24}$ | $r_{25}$ | |
| 3. $\overline{\text{SES}}$ | $r_{13}$ | $r_{23}$ | 1.00 | $r_{34}$ | $r_{35}$ | |
| 4. $\overline{\text{ACHV}}$ | $r_{14}$ | $r_{24}$ | $r_{34}$ | 1.00 | $r_{45}$ | SCHOOL CORRELATIONS |
| 5. PTR | $r_{24}$ | $r_{25}$ | $r_{35}$ | $r_{45}$ | 1.00 | |

Since this matrix is symmetric, the values below the main diagonal (upper left to lower right) will be the same as those above the diagonal. The dotted line is used to separate the submatrix of student correlations from school correlations. Using this matrix, and assuming that we are interested in the regression of ACHV on SES, we can conduct the following analyses:

TOTAL: The effectiveness of the regression of individual ACHV on SES is measured by $r^2_{12}$. For more than one variable it would be measured by the squared multiple correlation obtained by regressing individual ACHV on several other individual student variables. School variables can be brought into this analysis as well. For example, PTR can be brought into the analysis with SES and ACHV to give the multiple regression of ACHV on PTR and SES.

AMONG: The effectiveness of the regression of school $\overline{\text{ACHV}}$ on school $\overline{\text{SES}}$ is measured by $r^2_{34}$. For more than one variable it would be measured by the squared multiple correlation obtained by regressing school $\overline{\text{ACHV}}$ on several other school variables. For reasons given below, individual student variables are not brought into this kind of analysis.

WITHIN: A within-school regression is conducted by partialing $\overline{\text{ACHV}}$ out of ACHV by means of partial correlation techniques, and then regressing ACHV on SES (i.e. through observation of the squared partial correlation that remains). This operation renders the residuals of ACHV uncorrelated with or independent of $\overline{\text{ACHV}}$, and consequently uncorrelated with any other school variables that are correlated with $\overline{\text{ACHV}}$.[8]

$\overline{\text{ACHV}}$ is the one school variable that is most similar to or highly correlated with ACHV. The squared correlation of $\overline{\text{ACHV}}$ with ACHV represents the maximum amount of variance in ACHV that can be explained by analyzing differences among schools. Consequently, when $\overline{\text{ACHV}}$ is partialed out of ACHV all the remaining school variables are uncorrelated with ACHV. In general, when an individual student variable is correlated with its school mean counterpart, that correlation is the maximum value that can be obtained by correlating it with any other variable or combination of variables. When the school mean counterpart is partialed out of an individual student variable, all of the differences in that variable associated with differences among schools are removed. This is also one of the reasons why an individual student variable is not entered into an AMONG analysis: the maximum differences among schools on that variable are just as well represented by the variable's school mean counterpart.

### A.1.1. Commonality Analysis

Extensive use was made in this study of a technique called commonality analysis. This technique partitions the variance in a dependent variable that is predictable from two or more sets of regressor variables into the proportion that can be uniquely associated with each set, and the proportion that is in common with two or more of the sets. The following discussion will focus on the development of the model for two and three sets of variables and then go on to a discussion of the meaning of these results. A mathematical development of the model is given in the Technical Supplement.

Let us assume that we have two sets of variables, *B* and *S*. In the context of the ensuing chapters, *B* might represent different measures of the student's family background, *S* might represent different measures of the school he attends, and *A* might represent his achievement. Suppose now that we run a regression and obtain a squared multiple correlation for *A* against each set of variables, alone and in combination. For two sets of variables we will have three squared multiple correlations: $R^2(B)$; $R^2(S)$; and $R^2(B, S)$, where the letter or letters in parentheses represent the set or sets entered into the regression. Then the proportion of the squared multiple correlation that can be uniquely associated with the *B* and *S* sets, designated $U(B)$ and $U(S)$, is given by:

$$(1) \quad U(B)=R^2(B,S)-R^2(S)$$
$$(2) \quad U(S)=R^2(B,S)-R^2(B)$$

These unique values are sometimes referred to as first-order commonality coefficients. The proportion of predictable variance that is common to the two sets of variables, called the second-order commonality coefficient, is given by:

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[7] See the Technical Supplement for a comparison of the results obtained when we computed relationships among school variables using the student versus the school as the unit of observation and analysis. Sampling weights are also built into these tapes so that computations are based on estimated population rather than sample values.

[8] An algebraic proof of this assertion is given in the Technical Supplement.

$$(3)\quad C(B,S)=R^2(B,S)-U(B)-U(S)$$

This partitioning results in the following additive properties:

$$R^2(B)=C(B,S)+U(B)$$
$$R^2(S)=C(B,S)+U(S)$$

That is, the squared multiple correlations for $B$ and $S$ can be expressed as a function of their different orders of commonality coefficients, viz, the common portion plus the unique portion. In the context of our study this kind of analysis would indicate the extent to which the predictable variance is shared in common by the two sets, and the extent to which it can be associated with one or the other of the two sets.

The results of these analyses are organized somewhat as follows:

| Order of Commonality Coefficients | B 1 | S 2 |
|---|---|---|
| First U(Xi) | *a* | *b* |
| Second C(XIX2) | *c* | *c* |
| *R*-square(Xi) | *d* | *e* |
| *R*-SQ(XI,X2) | *f* | *f* |

In this table, the first-order commonality coefficient, or portion uniquely attributable to each set, is given in the $U(Xi)$ row. Here, $Xi$ stands for the set contained in each column, represented by $B$ and $S$ respectively. The second-order commonality coefficient is the same for each column, as is the R-$SQ(X1,X2)$. The squared multiple correlation for each set, $B$ or $S$, is given in the row R-SQUARE$(Xi)$. Also, the following empirical values in this table would be additive: $a+c=d$, $b+c=e$, and $a+b+c=f$. When we perform a unitizing operation on these results, the different order-of-commonality coefficients sum to 100. This operation is performed by dividing each of the empirical values in this table by the value for $f$. Usually only the unitized values for $U(Xi)$ and $C(XIX2)$ are presented.

For the three-set case let us designate the third set as $O$, for "other." From entering all the different combinations of sets in the regression we obtain the following squared multiple correlations: $R^2(B)$; $R^2(S)$; $R^2(O)$; $R^2(B,S)$; $R^2(B,O)$; $R^2(SO)$; and $R^2(B,S,O)$. Then the first-order commonality coefficients are given by:

$$U(B)=R^2(B,S,O)-R^2(S,O)$$
$$U(S)=R^2(B,S,O)-R^2(B,O)$$
$$U(O)=R^2(B,S,O)-R^2(B,S)$$

The second-order commonality coefficients are given by:

$$C(B,S)=R^2(B,S,O)-R^2(O)-U(B)-U(S)$$
$$C(B,O)=R^2(B,S,O)-R^2(S)-U(B)-U(O)$$
$$C(SO)=R^2(B,S,O)-R^2(B)-U(S)-U(O)$$

Finally, the third-order commonality coefficient, of which there is only one, is given by:

$$C(B,S,O)=R^2(B,S,O)-C(B,S)-C(B,O)-C(S,O)-U(B)-U(S)-U(O)$$

The squared multiple correlation for any single set can then be expressed as a function of its different order-of-commonality coefficients. For example, the squared multiple correlation for the "other" set, $R^2(O)$, can be ex-expressed as:

$$R^2(O)=C(B,S,O,)+C(B,O)+C(S,O)+U(O)$$

Results of three-set commonality analyses are organized somewhat as follows:

| Order of Commonality Coefficients | | B 1 | S 2 | O 3 |
|---|---|---|---|---|
| First | U(Xi) | *a* | *b* | *c* |
| Second | C(XIX2) | *d* | *d* | |
| | C(XIX3) | *e* | | *e* |
| | C(X2X3) | | *f* | *f* |
| Third | C(XIX2X3) | *g* | *g* | *g* |
| | R-square | *h* | *i* | *j* |
| | R-SQ (X1X2X3) | *k* | *k* | *k* |

With three sets there are now three second-order commonality coefficients. The additive properties are $a+d+e+g=h$; $b+d+f+g=i$; $c+e+f+g=j$; and $a+b+c+d+e+f+g=k$. When these coefficients are divided by R-SQ $(X1X2X3)$, which in the above table has the empirical value of $k$, they are called "unitized" coefficients. Usually only these unitized coefficients are given in the following chapters.

# APPENDIX B

## GEOGRAPHIC VARIATIONS IN THE DEVELOPMENT OF ACHIEVEMENT

This appendix presents commonality analyses, for each of our six racial-ethnic groups, of family background measures by sex and geographical location. The four geographic groupings used are: nonmetropolitan North; metropolitan North; nonmetropolitan South; and metropolitan South.[1]

By family background factors we mean the set of variables of: Socio-Economic Status (SES); Family Structure and Stability (FSS); Expectations for Excellence (EXPTN); Attitude Toward Life (ATTUD); Study Habits (HBTS); and Educational Plans (EDPLN). The first two variables together are called Home Background (HB), while the latter four are called Process (PRCS). All six make up Family Background (FB).

The four questions specifically addressed here are:

1. How do the relative roles of SES and FSS differ in each geographic locale?
2. How do the relative roles of HB and PRCS differ in each locale?
3. What is the magnitude of the role played in Achievement (ACHV) by EDPLN and the other measures in each locale, after students have been equated for differences in their HB?
4. How does average ACHV differ from one locale to another?

The remainder of this appendix is organized around analyses of these questions for each racial-ethnic group, by sex and locale. Discussion of the R-squares, that is, of differences in the percent of variation accounted for by the variables, is followed in each case by presentation of unitized commonality analyses. Various supplementary analyses are also presented.

### B.1. INDIAN AMERICANS

Differences among the Indian students would have been analyzed more meaningfully if we could have identified them according to their tribal affiliation or tribal background. Unfortunately, the information collected in this survey did not allow for such an identification. Accordingly, it should be borne in mind that the regional and local differences studied here reflect tribal and subgroup differences to an unknown degree.

Table B.1 shows the number of students included in the analyses for each geographic location. The small number from the metropolitan South suggests that results of analyses for this group, and comparisons of it with other groups, should be interpreted with caution. In figure B.1. the shaded portion shows the percent of variation in ACHV accounted for by SES and FSS. When the regional totals are compared with the national grand total it will be seen that the values are about 3 percent lower in the North and about 6 to 15 percent greater in the South. Although the percentages differ somewhat by sex, the same trend prevails. However, the metropolitan-nonmetropolitan differences are not nearly as pronounced, although it is clear that the percentages tend to be slightly higher in metropolitan areas. This is particularly true of females.

**Table B.1.—Number of 9th-Grade Indian Americans Included in the Analyses, by Sex and Geographic Location**

| Region | | Non-metropolitan | Metropolitan | Total |
|---|---|---|---|---|
| North | Male | 495 | 462 | 957 |
| | Female | 465 | 349 | 814 |
| | Total | 960 | 811 | 1,771 |
| South | Male | 468 | 119 | 587 |
| | Female | 425 | 94 | 519 |
| | Total | 893 | 213 | 1,106 |
| Total | Male | 963 | 581 | 1,544 |
| | Female | 890 | 443 | 1,333 |
| | Total | 1,853 | 1,024 | 2,877 |

Inspection of the commonality analyses in table B.2 shows that there are some pronounced departures from the national total. Differences among the geographic groups are most pronounced for the metropolitan–nonmetropolitan groups; these differences persist in both the North and South. For male and female combined, SES plays a much larger role than FSS in nonmetropolitan than in metropolitan areas. In fact, the role of SES exceeds that of FSS in nonmetropolitan areas by about 10 to 1, while in metropolitan areas the role of SES exceeds that of FSS by about 2 to 1 in the North (in the South the role of both variables is about the same). The sex variable, however, introduces some marked differences, particularly in metropolitan areas. In northern nonmetropolitan areas the role of FSS is slightly greater for males, while in southern nonmetropolitan areas the roles of both SES and FSS are greater for females. In metropolitan areas, both North and South, the role of FSS is greater for males than for females while the role of SES is greater for females than for males.

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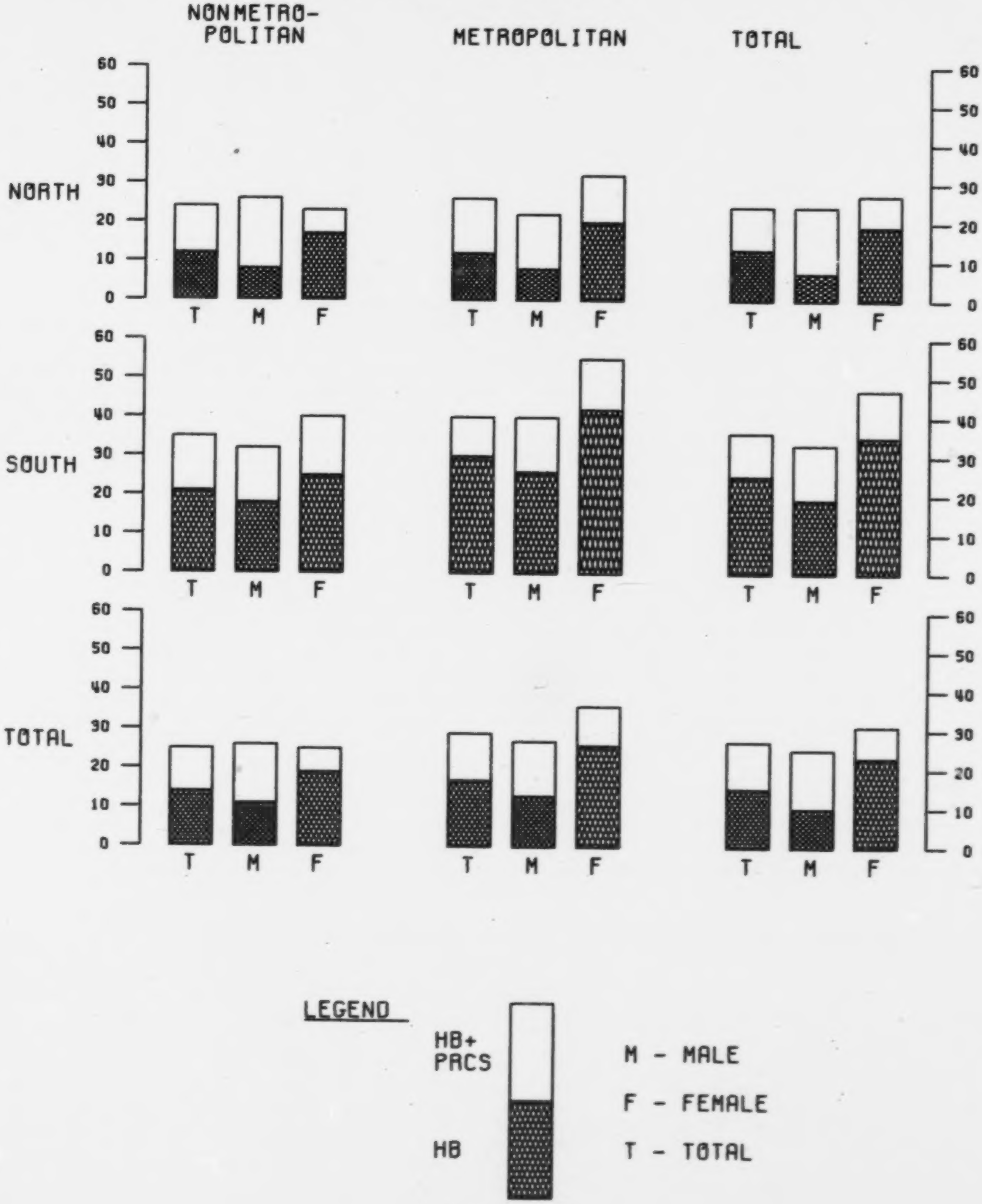
[1] The standard census tract was used to define metropolitan and nonmetropolitan areas. The South was defined to include the 16 southeastern and southwestern States of Alabama, Arkansas, Arizona, Florida, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, Tennessee, Virginia, and West Virginia. Included as North were all the remaining States. On one occasion, analyses were run for only the Middle Atlantic and Far Western States (see section B.5).

FIGURE B.1. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY SEX AND GEOGRAPHIC LOCATION, FOR INDIAN AMERICANS



B.1 (46a)

**Table B.2.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Sex and Geographic Location, for Indian Americans**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | SES | FSS | | SES | FSS | | SES | FSS | |
| North | Male | 73 | 11 | 16 | 23 | 48 | 29 | 48 | 28 | 24 |
| | Female | 73 | 5 | 22 | 64 | 6 | 30 | 71 | 6 | 23 |
| | Total | 74 | 8 | 18 | 48 | 20 | 32 | 63 | 14 | 23 |
| South | Male | 74 | 6 | 20 | 5 | 49 | 46 | 34 | 26 | 40 |
| | Female | 78 | 10 | 12 | 56 | 4 | 40 | 69 | 7 | 24 |
| | Total | 76 | 7 | 17 | 26 | 23 | 51 | 53 | 14 | 33 |
| Total | Male | 75 | 8 | 17 | 14 | 51 | 35 | 43 | 28 | 29 |
| | Female | 76 | 5 | 19 | 64 | 6 | 30 | 72 | 5 | 23 |
| | Total | 76 | 7 | 17 | 40 | 22 | 38 | 60 | 14 | 26 |

What these results seem to suggest is that the role in Achievement of Family Structure and Stability that is unrelated to Socio-Economic Status is greater for metropolitan Indian males. In other words, the extent to which a combination of low family disruption and low socioeconomic status is associated with variations in achievement is greatest for metropolitan areas. Thus Family Structure and Stability is of greater importance in understanding the Achievement of metropolitan Indian males than females, in general, and for understanding metropolitan rather than nonmetropolitan Indian groups.

Figure B.1 shows that when the PRCS variables are entered into the regression analysis with the HB variables they substantially increase the percent of ACHV explained. These increments (the white or plain areas in each bar in the figure) are more closely associated with sex than with region. Thus the increment is greatest for northern nonmetropolitan males but is similar in magnitude for all other male groups. For females the increment is least in the nonmetropolitan North and greatest in the nonmetropolitan South. But the absolute values for the R-squares (represented by the shaded and plain areas together) indicate the following series of increases in magnitude for females and both groups combined, from lowest to highest: northern nonmetropolitan; northern metropolitan; southern nonmetropolitan; southern metropolitan. For males this series starts with a low value for the metropolitan North, proceeds to the nonmetropolitan North, and ends with the nonmetropolitan and metropolitan South.

Moving on to table B.3, we note that there is a marked tendency for the role attributable to PRCS to exceed that of HB. Indeed, the only groups for which this is not true are those of nonmetropolitan northern females, for whom the relative roles are equal, and metropolitan southern females, for whom the role of HB is one and one-half times as large as that of PRCS. When the percentages for both males and females are examined by region we find that the role of PRCS is almost six times greater than that of HB in the metropolitan North. In the nonmetropolitan North it is about four times greater, and in the nonmetropolitan South about twice as great. In the metropolitan South, on the other hand, the roles of PRCS and HB are about equal. The sex variable, however, introduces pronounced differences in the relative roles of these sets of variables, especially in the North. Thus the extent to which PRCS exceeds HB for males varies as follows: nonmetropolitan North, 17 to 1; metropolitan North, 8 to 1; nonmetropolitan South, 4 to 1; and metropolitan South, 2 to 1. But for females the order is as follows: metropolitan North, almost 3 to 1; nonmetropolitan South, almost 2 to 1; nonmetropolitan North and metropolitan South, about 1 to 1. In summary, the dominant trend is for the role of PRCS to exceed that of HB. This trend is more pronounced for males than for females, and for males it is most pronounced in the North.

**Table B.3.—Commonality Analyses of Home Background and Process, by Sex and Geographic Location, for Indian Americans**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | Male | 4 | 68 | 28 | 8 | 64 | 28 | 3 | 70 | 27 |
| | Female | 26 | 26 | 48 | 14 | 36 | 50 | 21 | 29 | 50 |
| | Total | 11 | 49 | 40 | 9 | 51 | 40 | 9 | 51 | 40 |
| South | Male | 10 | 43 | 47 | 18 | 36 | 46 | 10 | 41 | 49 |
| | Female | 24 | 37 | 39 | 36 | 23 | 41 | 33 | 25 | 42 |
| | Total | 16 | 39 | 45 | 23 | 25 | 52 | 21 | 31 | 48 |
| Total | Male | 7 | 58 | 35 | 13 | 50 | 37 | 6 | 60 | 34 |
| | Female | 26 | 26 | 48 | 26 | 27 | 47 | 27 | 25 | 48 |
| | Total | 14 | 44 | 42 | 15 | 40 | 45 | 14 | 43 | 43 |

Table B.4.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Sex and Geographic Location, for Indian Americans

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | EDPLN | MTVTN | | EDPLN | MTVTN | | EDPLN | MTVTN | |
| North | Male | 25 | 27 | 48 | 28 | 51 | 21 | 27 | 35 | 38 |
| | Female | 7 | 67 | 26 | 14 | 54 | 32 | 12 | 57 | 31 |
| | Total | 20 | 40 | 40 | 22 | 52 | 26 | 21 | 44 | 35 |
| South | Male | 46 | 28 | 26 | 57 | 13 | 30 | 46 | 19 | 35 |
| | Female | 27 | 33 | 40 | 1 | 91 | 8 | 11 | 62 | 27 |
| | Total | 38 | 29 | 33 | 25 | 48 | 27 | 30 | 37 | 33 |
| Total | Male | 30 | 25 | 45 | 37 | 37 | 26 | 32 | 29 | 39 |
| | Female | 15 | 50 | 35 | 9 | 63 | 28 | 14 | 55 | 31 |
| | Total | 25 | 35 | 40 | 23 | 48 | 29 | 24 | 40 | 36 |

The next question involves the role of EDPLN in ACHV when MTVTN is taken into account. First, ACHV was adjusted for differences among students in their HB. Thus the subsequent analysis involved only the unshaded portions of the bars in figure B.1. These unshaded areas are greatest for males and smallest for females in the nonmetropolitan North. For all other groups, the shaded and unshaded portions are closer in magnitude.

Commonality analyses for these two sets of variables, EDPLN and MTVTN, are given in table B.4. Inspection of the totals for the different regional groups shows that the role of MTVTN is almost twice that of EDPLN except in the nonmetropolitan South, where the role of EDPLN exceeds that of MTVTN by a factor of 1.3 to 1. When sex differences are examined one notes that the role of EDPLN is always greater for males, particularly in the South. In summary, for groups other than southern males, the role of MTVTN exceeds that of EDPLN. For southern males the reverse is true. When male and female differences are examined, the percentage role of EDPLN is always greater for males. This difference is most pronounced in the South.

Table B.5 shows the mean ACHV for each group. Inspection of the group totals by location shows that the nonmetropolitan South lags behind the other groups by some 2 to 3 points. Sex differences within each group display no consistent pattern: males score higher than females by about 1 point in the nonmetropolitan North and by about 1.5 points in the nonmetropolitan South. But in metropolitan areas, both North and South, females score almost 2 points higher than males. In summary: females score higher than males in metropolitan areas, while males score higher than females in nonmetropolitan areas. A slight tendency can also be observed for the North to have a higher overall average than the South. The most extreme differences are between northern metropolitan females and southern nonmetropolitan females.

Table B.5.—Mean Achievement of Indian Americans, by Sex and Geographic Location

| | | MEAN ACHV | | |
|---|---|---|---|---|
| Region | Sex | Nonmetropolitan | Metropolitan | Total |
| North | Male | 45.24 | 45.09 | 45.18 |
| | Female | 44.53 | 46.63 | 45.29 |
| | Total | 44.90 | 45.81 | 45,24 |
| South | Male | 43.95 | 44.14 | 44.03 |
| | Female | 42.62 | 46.04 | 44.19 |
| | Total | 43.36 | 45.01 | 44.10 |
| Total | Male | 44.90 | 44.79 | 44.86 |
| | Female | 44.09 | 46.45 | 45.00 |
| | Total | 44.52 | 45.56 | 44.93 |

Analyses for Indian Americans have shown that:

1. For nonmetropolitan groups, SES plays a much greater role than FSS, while for metropolitan groups FSS plays a greater role for males and SES continues to play a greater role for females.

2. For almost all regional groups the role of PRCS exceeds that of HB, although this is truer of males than of females, and truest of males in the North.

3. For groups other than southern males, MTVTN played a larger role relative to EDPLN, although the role for EDPLN was always greater for males, especially in the South.

4. Mean ACHV was found strongly related to sex, with females scoring higher in metropolitan areas and males higher in nonmetropolitan areas (the most extreme difference was found between females in the metropolitan North and nonmetropolitan South).

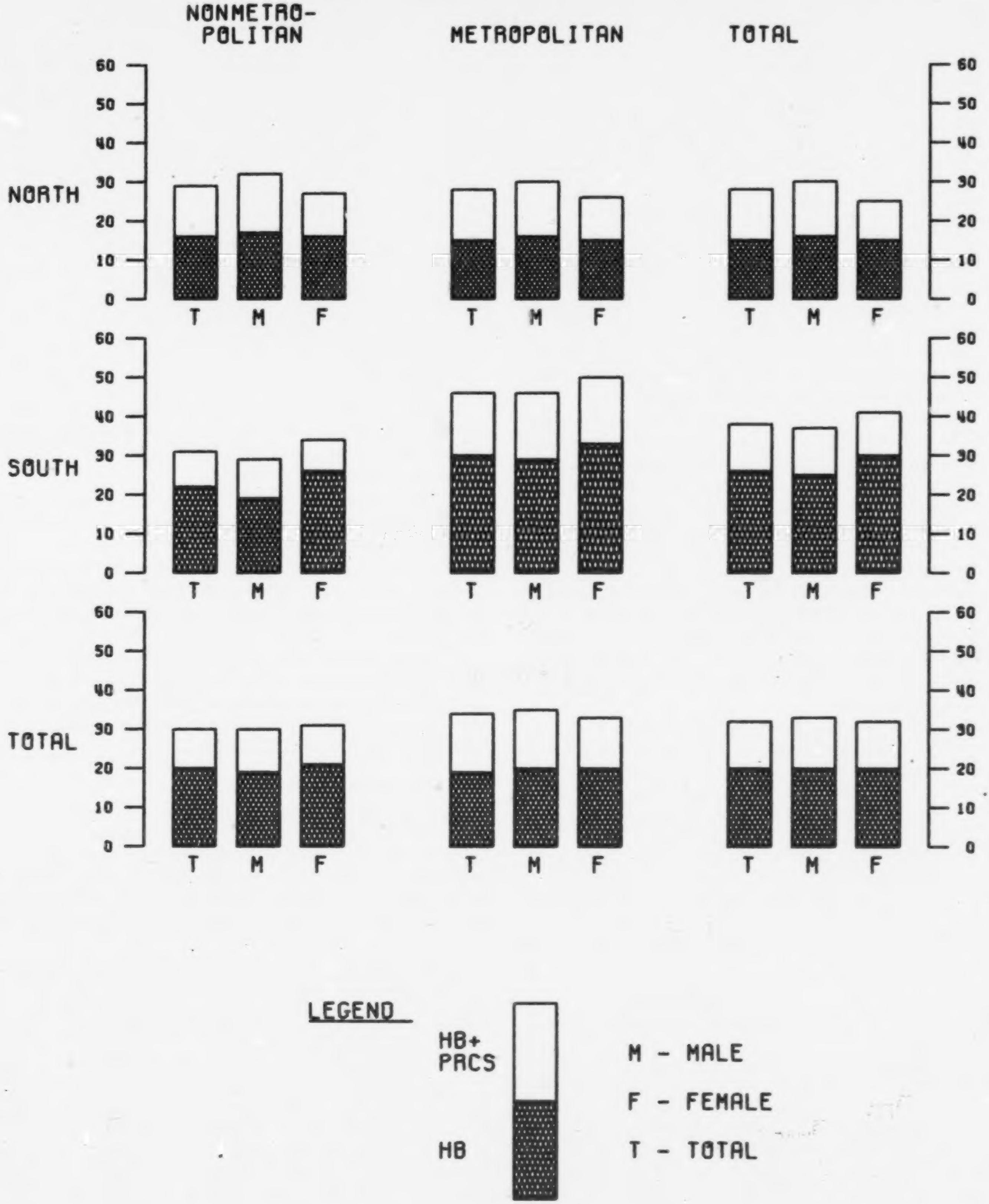
## B.2. MEXICAN-AMERICANS

The cultural diversity of the Mexican-American students in this study is second only to that of the Indian Americans. Thus Mexican students in the nonmetropolitan South may have cultural practices very different from those in the North; indeed, by virtue of their rural location they may view life quite differently. Table B.6

Table B.6.—Number of 9th-Grade Mexican-Americans Included in the Analyses, by Sex and Geographic Location

| Region | Sex | Nonmetropolitan | Metropolitan | Total |
|---|---|---|---|---|
| North | Male | 383 | 1,416 | 1,799 |
| | Female | 280 | 1,094 | 1,374 |
| | Total | 663 | 2,510 | 3,173 |
| South | Male | 1,152 | 440 | 1,592 |
| | Female | 769 | 302 | 1,071 |
| | Total | 1,921 | 742 | 2,663 |
| Total | Male | 1,535 | 1,856 | 3,391 |
| | Female | 1,049 | 1,396 | 2,445 |
| | Total | 2,584 | 3,252 | 5,836 |

FIGURE B.2 - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY SEX AND GEOGRAPHIC LOCATION, FOR MEXICAN AMERICANS



B.2 (47a)

Table B.7.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Sex and Geographic Location, for Mexican-Americans

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | | SES | FSS | | SES | FSS | | SES | FSS | |
| North | Male | 29 | 45 | 26 | 27 | 41 | 32 | 27 | 43 | 30 |
| | Female | 26 | 40 | 34 | 58 | 10 | 32 | 49 | 18 | 23 |
| | Total | 28 | 43 | 29 | 38 | 28 | 34 | 35 | 32 | 33 |
| South | Male | 52 | 25 | 23 | 34 | 37 | 29 | 44 | 29 | 27 |
| | Female | 60 | 22 | 18 | 58 | 14 | 28 | 60 | 18 | 22 |
| | Total | 55 | 25 | 20 | 43 | 27 | 30 | 50 | 25 | 25 |
| Total | Male | 46 | 30 | 24 | 31 | 37 | 32 | 38 | 33 | 29 |
| | Female | 50 | 26 | 24 | 59 | 11 | 30 | 56 | 16 | 28 |
| | Total | 47 | 29 | 24 | 41 | 26 | 33 | 45 | 26 | 29 |

shows that most of the students included in these analyses reside in either the metropolitan North or nonmetropolitan South. Insofar as the differences among them are related to structural aspects of the family or to family child-rearing practices, they are of interest to us.

The shaded portions of figure B.2 show the percent of variation in ACHV explained by the HB measures for the different geographic groups. The size of the *R*-squares —that is, the extent of explanation—varies in descending order as follows: metropolitan South; nonmetropolitan South; nonmetropolitan North; and metropolitan North. This same trend tends to hold for males and females in each region. The largest differences, however, are between North and South.

The commonality analyses in table B.7 also exhibit marked regional and sex group differences. Inspection of the group totals shows that SES plays a diminishing role and FSS an increasing role according to the following sequence: nonmetropolitan South; metropolitan South; metropolitan North; and nonmetropolitan North. Indeed the role of FSS is much more pronounced in the nonmetropolitan North, where it is about one and one-half times as great as that of SES. In the other groups, however, the role of SES exceeds that of FSS, being about one and one-half to two times greater.

When the regional groups are examined by sex some marked differences appear. The role of FSS tends to be uniformly larger for males than for females. In the South and the metropolitan North the role of SES is greater for females than for males. In addition, for northern and southern metropolitan males the role of FSS exceeds that of SES. However, for southern nonmetropolitan males the role of SES continues to exceed that of FSS. We may also note that for northern nonmetropolitan females the role of FSS exceeds that of SES by a factor of almost 2 to 1, whereas in the other groups the role of SES exceeds that of FSS by a factor ranging from almost 3 to 1 to 6 to 1.

To sum up:

1. FSS was found to play a greater role than SES in the nonmetropolitan North, whereas in the other areas SES played a greater role.

2. FSS had a uniformly greater role for males than for females, particularly in metropolitan areas, while SES had a greater role for females except in the nonmetropolitan North.

3. For males, FSS had a greater relative role than SES except in the nonmetropolitan South.

4. Except in the nonmetropolitan North, SES had a greater relative role for females than FSS.

The second question deals with the role that HB factors play when juxtaposed with PRCS factors. Figure B.2 shows that the PRCS measures substantially increase the magnitude of the R-squares when they are entered into the regression with the HB measures. These increases are greatest in the metropolitan South, somewhat lower in the North, and lowest in the nonmetropolitan South. Inspection of the absolute values of the R-squares for the different groups using the FB measures (viz, HB plus PRCS, or the shaded and plain areas combined) shows that they have the following ordering from highest to lowest: metropolitan South; nonmetropolitan South; nonmetropolitan North; and metropolitan North. These values are largest by far in the metropolitan South, surpassing their nearest neighbor, the nonmetropolitan South, by about 15 percent.

The commonality analyses in table B.8 show that there is a pronounced tendency for the role of PRCS to exceed that of HB. The only exception is that of southern nonmetropolitan females, for whom the relative roles are more nearly equal. Inspection of the group totals shows that the role of PRCS is almost four times greater than that of HB in the metropolitan North, but that it drops to twice as great in the nonmetropolitan North and metropolitan South, and to being almost equal (although still in favor of PRCS) in the nonmetropolitan South. Moreover, the role of PRCS is uniformly larger for males than for females, while the role of HB is greater for females than for males except in the metropolitan South. For males, the role of PRCS exceeds that of HB by the following factor in each locale: metropolitan North, 4 to 1; nonmetropolitan North, 3.4 to 1; metropolitan South, 2.2 to 1; and nonmetropolitan South, 1.4 to 1. The greatest differences, however, are between North and South. For females a somewhat different picture emerges: the role of PRCS exceeds that of HB by 3.2 to 1 in the metropolitan North; 2.4 to 1 in the metropolitan South; and 1.5 to 1 in the metropolitan North. In the nonmetropoli-

Table B.8.—Commonality Analyses of Home Background and Process, by Sex and Geographic Location, for Mexican-Americans

| Region | Sex | Nonmetropolitan |  |  | Metropolitan |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  |  | HB | PRCS |  | HB | PRCS |  | HB | PRCS |  |
| North | Male | 14 | 48 | 38 | 12 | 48 | 40 | 13 | 47 | 40 |
|  | Female | 28 | 43 | 29 | 13 | 41 | 46 | 17 | 41 | 42 |
|  | Total | 21 | 44 | 35 | 12 | 46 | 42 | 15 | 45 | 40 |
| South | Male | 22 | 32 | 46 | 16 | 36 | 48 | 19 | 33 | 48 |
|  | Female | 26 | 24 | 50 | 14 | 34 | 52 | 20 | 28 | 52 |
|  | Total | 24 | 29 | 47 | 15 | 35 | 50 | 19 | 31 | 50 |
| Total | Male | 19 | 37 | 44 | 13 | 44 | 43 | 16 | 41 | 43 |
|  | Female | 26 | 32 | 42 | 14 | 39 | 47 | 19 | 36 | 45 |
|  | Total | 22 | 35 | 43 | 13 | 43 | 44 | 17 | 39 | 44 |

tan South PRCS and HB are more nearly on an equal footing (actually the factor is .9). For females, then, the extent to which PRCS exceeds HB is far more pronounced in metropolitan than in nonmetropolitan areas. In summary, the dominant trend is for the role of PRCS to exceed that of HB. For males this trend is at its highest in the North, and for females in metropolitan areas.

The next set of analyses dealt with the relative roles played by Educational Plans and Desires (EDPLN), on the one hand, and the three short-term motivational factors (MTVTN), on the other, after ACHV had been adjusted for differences in HB. The plain areas on the bar graphs in figure B.2 represent the percent of variation in ACHV that is being analyzed after differences attributable to HB have been subtracted out. This plain area is largest for the metropolitan South and smallest for the nonmetropolitan South. Values for the North are intermediate and close together in magnitude.

Inspection of the relative roles played by EDPLN and MTVTN for the group totals in table B.9 reveals some marked geographic differences. The role of MTVTN exceeds that of EDPLN most in the nonmetropolitan areas. This effect is most pronounced in the nonmetropolitan South (by a factor of about 3 to 1), followed by the nonmetropolitan North (about 2.5 to 1). In the metropolitan areas the role of MTVTN exceeds that of EDPLN by about 1.7 to 1 in the South, but in the metropolitan North the two roles are equal. For some of the geographic groups the picture changes considerably when sex differences are examined. The role of EDPLN is uniformly greater for males than for females in both the South and the metropolitan North. Similarly, the role of MTVTN is much greater for females than for males in all areas. For males the relative roles of EDPLN and MTVTN vary with geographic location. In the metropolitan North the role of EDPLN exceeds that of MTVTN by about 1.5 to 1. In the other areas, however, MTVTN exceeds EDPLN. The extent to which it does so is smallest in the metropolitan South and largest in the nonmetropolitan North, with the nonmetropolitan South in between. For females the role of MTVTN always exceeds that of EDPLN to an extent that is greatest in the nonmetropolitan South followed by the metropolitan South and the nonmetropolitan North. It is smallest of all for the metropolitan North. In summary, for almost all of the regional groups (the exception being northern metropolitan males) the role of MTVTN either equals or (more usually) exceeds that of EDPLN. However, EDPLN plays a greater role for males than for females, particularly in the South and metropolitan North, while MTVTN plays a greater role for males in all areas.

Table B.10 presents regional differences in mean ACHV for these different groups. The sex differences within each regional group show the females scoring slightly higher than the males except in the nonmetropolitan North, where the males have an almost indistinguishable edge. For the other groups the sex differences increase from .5 of a point in the metropolitan North to 1 point in the metropolitan South to almost 2 points in the nonmetropolitan South. Mexican-American students in the non-

Table B.9.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Sex and Geographic Location, for Mexican-Americans

| Region | Sex | Nonmetropolitan |  |  | Metropolitan |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  |  | EDPLN | MTVTN |  | EDPLN | MTVTN |  | EDPLN | MTVTN |  |
| North | Male | 19 | 47 | 34 | 38 | 26 | 36 | 33 | 30 | 37 |
|  | Female | 18 | 64 | 18 | 23 | 46 | 31 | 23 | 49 | 28 |
|  | Total | 19 | 49 | 32 | 33 | 33 | 34 | 30 | 36 | 34 |
| South | Male | 22 | 45 | 33 | 27 | 37 | 36 | 27 | 38 | 35 |
|  | Female | 7 | 63 | 30 | 18 | 56 | 26 | 13 | 56 | 31 |
|  | Total | 15 | 53 | 32 | 23 | 41 | 36 | 21 | 44 | 35 |
| Total | Male | 22 | 46 | 32 | 34 | 29 | 37 | 30 | 35 | 35 |
|  | Female | 10 | 63 | 27 | 22 | 49 | 29 | 17 | 53 | 30 |
|  | Total | 16 | 53 | 31 | 29 | 36 | 35 | 25 | 42 | 33 |

metropolitan South are the ones who lag behind the others: the difference between northern metropolitan males and southern nonmetropolitan males is almost 3 points while this same difference for females is almost 2 points. Students in the nonmetropolitan South are thus about .25 of a standard deviation behind those in the metropolitan North.

Table B.10.—Mean Achievement of Mexican-Americans, by Sex and Geographic Location

| Region | Sex | Mean ACHV<br>Nonmetropolitan | Metropolitan | Total |
|---|---|---|---|---|
| North | Male | 44.58 | 44.14 | 44.27 |
| | Female | 44.28 | 44.66 | 44.54 |
| | Total | 44.45 | 44.36 | 44.39 |
| South | Male | 41.15 | 43.52 | 42.28 |
| | Female | 42.89 | 44.44 | 43.62 |
| | Total | 41.87 | 43.90 | 42.83 |
| Total | Male | 42.54 | 43.92 | 43.38 |
| | Female | 43.48 | 44.58 | 44.15 |
| | Total | 42.94 | 44.20 | 43.71 |

Analyses in this section have shown that:

1. FSS has a uniformly greater role for males than for females, particularly in metropolitan areas, while SES has a greater role for females, except in the nonmetropolitan North.

2. The role of PRCS tends to exceed that of HB to an extent that is greatest for males in the North and greatest for females in the South.

3. MTVTN plays a greater role than EDPLN for females, while EDPLN plays a greater role for males than for females, especially in the South and metropolitan North.

4. Females tend to have higher mean ACHV than males, the magnitude of this difference increasing progressively through the metropolitan areas to the nonmetropolitan South.

5. The greatest regional difference in achievement was on the order of 2.5 points, or .25 of a standard deviation, between students in the metropolitan North and nonmetropolitan South.

## B.3. PUERTO RICAN AMERICANS

It is apparent from table B.11 that most of the Puerto Rican students included in this survey resided in the metropolitan North. Of these the overwhelming majority were residents of New York City. The small numbers of students in the nonmetropolitan North and metropolitan South indicate that results of analyses for these groups should be treated with caution. Curious also is the disproportionately lower proportion of females in other than the northern metropolitan group. Perhaps in these other areas a greater proportion of Puerto Rican females drop out before reaching the ninth grade. The differences are pronounced enough, however, to warrant our treating the analytic results with caution.

Inspection of figure B.3 shows that the percent of variation in ACHV explained by the HB measures varies considerably for the different geographic groups. The group totals show a progressive increase that starts with the nonmetropolitan North, almost doubles in the metropolitan North, then almost doubles again in the nonmetropolitan South to taper off at a slightly higher value in the metropolitan South. There are also substantial sex differences. Thus the values for females are larger than those for males in both the nonmetropolitan North and the metropolitan South. In the metropolitan North the opposite is true, as it is (though to a lesser extent) in the nonmetropolitan South.

Commonality analyses of the roles of SES and FSS are given in table B.12. Since the northern metropolitan group is by far the largest their results will be given most emphasis in the following discussion. Nationally, however,

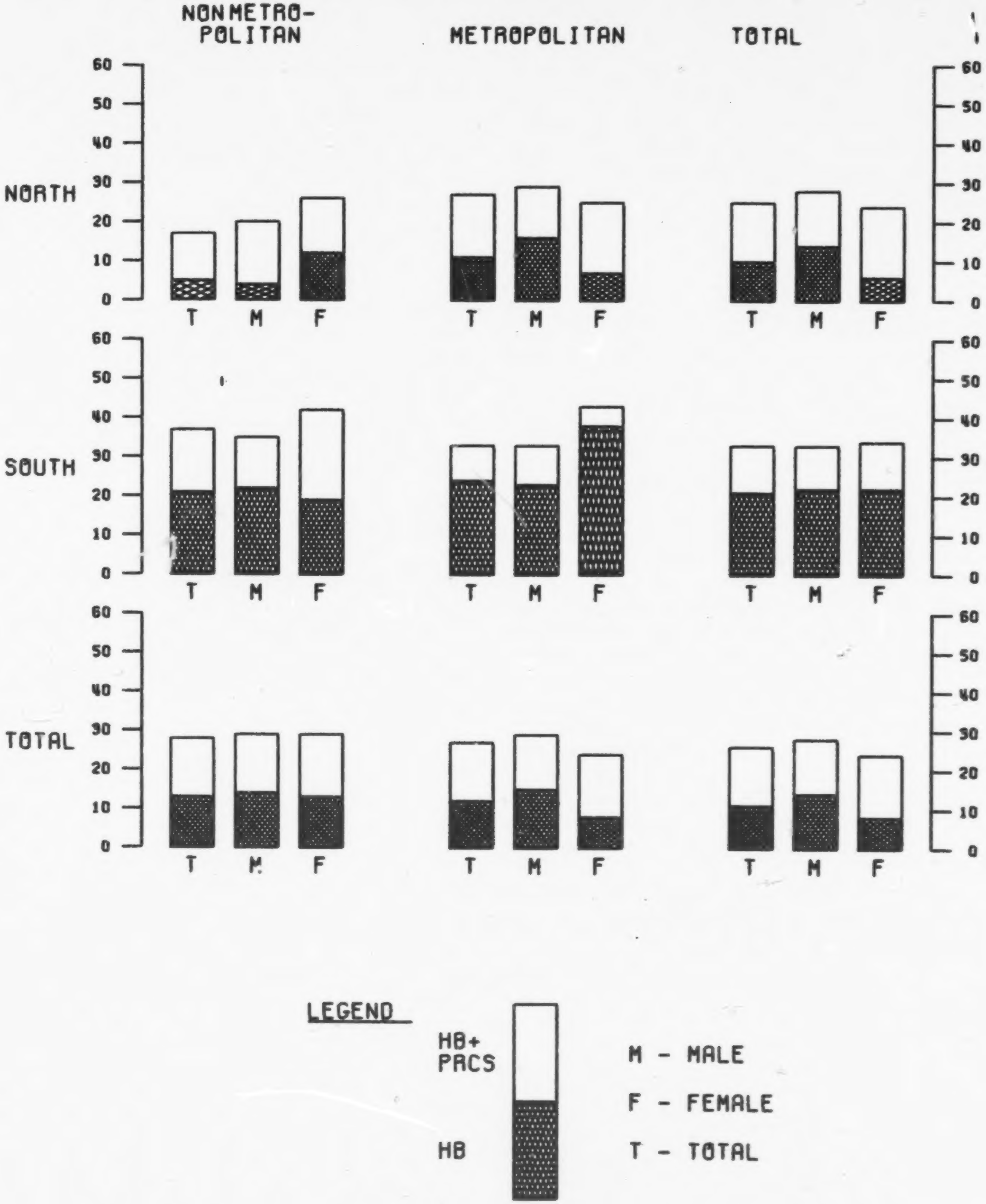
Table B.11.—Number of 9th-Grade Puerto Ricans Included in the Analyses, by Sex and Geographic Location

| Region | Sex | Nonmetropolitan | Metropolitan | Total |
|---|---|---|---|---|
| North | Male | 62 | 1,441 | 1,503 |
| | Female | 37 | 1,518 | 1,555 |
| | Total | 99 | 2,959 | 3,058 |
| South | Male | 278 | 123 | 401 |
| | Female | 177 | 66 | 243 |
| | Total | 455 | 189 | 644 |
| Total | Male | 340 | 1,564 | 1,904 |
| | Female | 214 | 1,584 | 1,798 |
| | Total | 554 | 3,148 | 3,702 |

Table B.12.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Sex and Geographic Location, for Puerto Ricans

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | SES | FSS | | SES | FSS | | SES | FSS | |
| North | Male | 25 | 71 | 4 | 58 | 11 | 31 | 48 | 28 | 24 |
| | Female | 6 | 94 | 0 | 53 | 14 | 33 | 71 | 6 | 23 |
| | Total | 4 | 91 | 5 | 56 | 12 | 32 | 52 | 17 | 31 |
| South | Male | 48 | 22 | 30 | 53 | 31 | 16 | 34 | 26 | 40 |
| | Female | 45 | 39 | 16 | 78 | 4 | 18 | 69 | 7 | 24 |
| | Total | 45 | 30 | 25 | 65 | 7 | 28 | 54 | 19 | 27 |
| Total | Male | 75 | 8 | 17 | 14 | 51 | 35 | 51 | 21 | 28 |
| | Female | 76 | 5 | 19 | 64 | 6 | 30 | 42 | 23 | 35 |
| | Total | 35 | 45 | 20 | 51 | 16 | 33 | 47 | 22 | 31 |

FIGURE B.3. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY SEX AND GEOGRAPHIC LOCATION, FOR PUERTO RICANS



B.3 (48a)

Table B.13.—Commonality Analyses of Home Background and Process, by Sex and Geographic Location, for Puerto Ricans

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | Male | 9 | 78 | 13 | 9 | 45 | 46 | 9 | 48 | 43 |
| | Female | 34 | 55 | 11 | 1 | 73 | 26 | 1 | 73 | 26 |
| | Total | 3 | 70 | 27 | 4 | 58 | 38 | 4 | 60 | 36 |
| South | Male | 13 | 36 | 51 | 12 | 30 | 58 | 15 | 33 | 52 |
| | Female | 9 | 53 | 38 | 45 | 12 | 13 | 14 | 35 | 51 |
| | Total | 10 | 43 | 47 | 18 | 26 | 56 | 14 | 36 | 50 |
| Total | Male | 13 | 50 | 37 | 7 | 47 | 46 | 8 | 48 | 44 |
| | Female | 8 | 56 | 36 | 2 | 66 | 32 | 2 | 65 | 33 |
| | Total | 8 | 53 | 39 | 4 | 56 | 40 | 5 | 55 | 40 |

SES exceeds FSS for both males and females by a factor of about 2 to 1, compared with a factor of almost 5 to 1 in the metropolitan North. The other groups vary considerably. The next most stable group (stable, that is, in terms of the number of students it contains) is the nonmetropolitan South, where the role of SES exceeds that of FSS by a factor of about 1.5 to 1. For the next most stable group, the metropolitan South, the role of SES is about 9 times greater than that of FSS. Finally, in the nonmetropolitan North the role of FSS exceeds that of SES. But the values here are so different from those for the other groups that it is difficult to place much reliance on them.

When sex differences are examined the results in the metropolitan North tend to parallel those for the Nation. That is, SES plays a slightly greater role for males, while FSS plays a slightly greater role for females. For the nonmetropolitan South, however, the opposite is true. Again, for males, the role of SES exceeds that of FSS by a factor of about 5 to 1 in the metropolitan North, by 4 to 1 in the nonmetropolitan South, and by almost 2 to 1 in the metropolitan South; the only exception to this trend is the nonmetropolitan North. For females somewhat different results are observed: the role of SES exceeds that of FSS by 4 to 1 in the metropolitan North, by 1.2 to 1 in the nonmetropolitan South, and by 19 to 1 in the metropolitan South. Once more, the nonmetropolitan North is the exception.

In summary, for groups in areas other than the nonmetropolitan North, the role of SES exceeds that of FSS. When sex differences are examined, it appears that in the metropolitan North and nonmetropolitan South the role of SES is greater for males while that of FSS is greater for females. In the metropolitan South this trend is reversed. Finally, in the nonmetropolitan North FSS tends to play the dominant role.

Figure B.3 shows what happens when the PRCS measures are brought into the analysis. The magnitude of the R-squares is increased most in the metropolitan North and nonmetropolitan South, followed by the nonmetropolitan North and then, with the lowest values, the metropolitan South. For males these increments are greatest in the nonmetropolitan North and least in the nonmetropolitan South, with the metropolitan North in between. For females, however, the increments are (in descending order) from nonmetropolitan South through metropolitan North to nonmetropolitan North and, finally, metropolitan South. The absolute values of the R-squares are largest in the South, smaller in the metropolitan North, and smallest in the nonmetropolitan North.

Table B.13 shows the commonality analyses for HB and PRCS. Inspection of the values for the group totals shows that moving from the national total to the metropolitan North involves a slight increase in the role of PRCS and a slight drop in that of HB. For the national total the role of PRCS exceeds that of HB by about 11 to 1, whereas in the metropolitan North this factor rises to about 14 to 1. For the other areas too, the role of PRCS exceeds that of HB, the factor being as high as 4.3 to 1 in the nonmetropolitan South and as low as 1.4 to 1 in the metropolitan South. This trend also prevails in the nonmetropolitan North.

When sex differences are examined it will be seen that there are marked variations in the extent to which PRCS exceeds HB, particularly in the metropolitan North. There, as well as in the nonmetropolitan South, the role of PRCS is much greater for females than for males. But in the nonmetropolitan North and metropolitan South the role of PRCS is greater for males than for females. For males, the role of PRCS exceeds that of HB by about 5 to 1 in the North and a little more than 2 to 1 in the South. For females a somewhat different trend prevails, depending upon the area. In the North and nonmetropolitan South the role of PRCS continues to exceed that of HB by about 73 to 1 and 6 to 1, respectively. In the metropolitan South, however, the role of HB is almost 4 times greater than that of PRCS.

In summary then, for all regional group totals the role of PRCS exceeds that of HB. However, the role of PRCS was found to be greater for females than for males in the metropolitan North and nonmetropolitan South, whereas the reverse was true for other regions. For males as well as for females (except in the metropolitan South) the role of PRCS continued to exceed that of HB—often quite dramatically so.

We now pass to the role played by EDPLN relative to the set of short-term variables called MTVTN. First, the usual adjustments were made in ACHV for differences in HB. The magnitude of the variation in ACHV that is being analyzed after the differences attributable to HB were

Table B.14.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Sex and Geographic Location, for Puerto Ricans

| Region | Sex | Nonmetropolitan |  |  | Metropolitan |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Unique |  | Common | Unique |  | Common | Unique |  | Common |
|  |  | EDPLN | MTVTN |  | EDPLN | MTVTN |  | EDPLN | MTVTN |  |
| North | Male | 23 | 34 | 43 | 18 | 38 | 44 | 23 | 33 | 44 |
|  | Female | 20 | 80 | 0 | 14 | 50 | 36 | 13 | 51 | 36 |
|  | Total | 9 | 44 | 47 | 16 | 44 | 40 | 18 | 41 | 41 |
| South | Male | 47 | 22 | 31 | 22 | 23 | 55 | 40 | 20 | 40 |
|  | Female | 29 | 31 | 40 | 71 | 29 | 0 | 43 | 17 | 40 |
|  | Total | 41 | 23 | 36 | 50 | 9 | 41 | 45 | 16 | 37 |
| Total | Male | 35 | 24 | 41 | 23 | 30 | 47 | 32 | 24 | 44 |
|  | Female | 9 | 46 | 45 | 15 | 47 | 38 | 15 | 45 | 40 |
|  | Total | 25 | 30 | 45 | 19 | 38 | 43 | 24 | 33 | 43 |

subtracted out is represented by the plain area of each bar in figure B.3. These plain areas tend to be largest for males in the North and nonmetropolitan South and for females in the metropolitan North and nonmetropolitan South.

The commonality analyses of EDPLN and MTVTN in table B.14 show some marked north-south differences for the group totals. In the North the role of MTVTN exceeds that of EDPLN by a factor of 2.3 to 1, whereas in the South this trend is reversed with the role of EDPLN exceeding that of MTVTN by a factor of almost 3 to 1. When sex differences are examined, however, we can note some variations in these trends. In the North, the role of MTVTN continues to exceed that of EDPLN by a factor of about 1.5 to 1 for males and almost 4 to 1 for females. In the South, however, the role of EDPLN exceeds that of MTVTN for males in nonmetropolitan areas and for females in metropolitan areas. For metropolitan males and nonmetropolitan females the roles are more nearly equal. As with the earlier groups, the characteristic sex difference is apparent: except for the nonmetropolitan South, the role of EDPLN is greater for males while that of MTVTN is greater for females. In summary:

1. For the group totals the role of MTVTN exceeds that of EDPLN in the North, while the reverse is true in the South.

2. The role of EDPLN is greater for males than for females, while the role of MTVTN is greater for females, except in the metropolitan South.

3. For males, the role of MTVTN equals or exceeds that of EDPLN except in the nonmetropolitan South, where the reverse is true.

4. For females, the role of MTVTN exceeds that of EDPLN except in the metropolitan South, where the reverse is true.

Table B.15 shows mean achievement scores for the different geographic groups. It will be noted that the group totals make up the following series in descending order of magnitude: metropolitan North; nonmetropolitan North; metropolitan South; and nonmetropolitan South. Across regional groups the sex differences are not consistent and vary in magnitude. In the metropolitan North males and females display almost identical values, with a slight edge going to the males. In the other regions the females take the lead. Their largest lead is in the nonmetropolitan North, their next-to-largest in the metropolitan South, and their smallest in the nonmetropolitan South. The largest difference—one of 6 points or .6 of a standard deviation—is between northern metropolitan and southern nonmetropolitan males.

Table B.15.—Mean Achievement of Puerto Ricans, by Sex and Geographic Location

| Region | Sex | Mean ACHV |  |  |
|---|---|---|---|---|
|  |  | Nonmetropolitan | Metropolitan | Total |
| North | Male | 38.83 | 42.26 | 41.85 |
|  | Female | 42.55 | 41.92 | 41.97 |
|  | Total | 40.10 | 42.10 | 41.91 |
| South | Male | 36.11 | 36.16 | 36.13 |
|  | Female | 37.41 | 38.02 | 37.64 |
|  | Total | 36.64 | 36.80 | 36.71 |
| Total | Male | 37.24 | 41.47 | 40.54 |
|  | Female | 39.22 | 41.63 | 41.24 |
|  | Total | 37.99 | 41.54 | 40.86 |

In general, we have seen in this section that for Puerto Rican students:

1. SES plays a more prominent role than FSS except in the nonmetropolitan North, where the reverse is true.

2. FSS plays a greater role for females than for males and SES a greater role for males except in the metropolitan South, where the reverse is true.

3. For all groups differentiated by region or sex (except females in the metropolitan South) the role of PRCS exceeds that of HB, often to a dramatic extent.

4. In the North the role of MTVTN exceeds that of EDPLN for all groups, whereas in the South, this is true only for nonmetropolitan females and metropolitan males.

5. Southern nonmetropolitan males lagged behind northern metropolitan males in mean ACHV by nearly .6 of a standard deviation.

6. In the nonmetropolitan North, males lagged behind females in mean achievement by as much as .4 of a standard deviation.

Table B.22.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Sex and Geographic Location, for Oriental-Americans

| Region | Sex | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| | | SES | FSS | | SES | FSS | | SES | FSS | |
| Mid-Atlantic | Male | .. | .. | .. | 14 | 52 | 34 | 24 | 40 | 36 |
| | Female | .. | .. | .. | 22 | 57 | 21 | 25 | 53 | 22 |
| | Total | .. | .. | .. | 17 | 54 | 29 | 24 | 46 | 30 |
| Far West | Male | 64 | 18 | 18 | 15 | 46 | 39 | 42 | 27 | 31 |
| | Female | 81 | 7 | 12 | 70 | 15 | 15 | 74 | 12 | 14 |
| | Total | 68 | 15 | 17 | 33 | 34 | 33 | 52 | 23 | 25 |
| Total | Male | 57 | 20 | 23 | 14 | 48 | 38 | 30 | 35 | 35 |
| | Female | 40 | 44 | 16 | 37 | 32 | 31 | 36 | 39 | 25 |
| | Total | 51 | 29 | 20 | 22 | 42 | 36 | 32 | 37 | 31 |

waii, or New York. Although the resulting sample sizes are much smaller than those for the other racial-ethnic groups, they are large enough to support the generalizations required by our analyses.

The percent of variation in ACHV accounted for by the home backround measures of SES and FSS is illustrated by the shaded areas in figure B.5 (the values for the mid-Atlantic, nonmetropolitan area were not computed due to the small sample). As may be seen, the total values as well as those for males show only slight variations from cell to cell. For females, however, there are differences that extend across both regions and, in the Far West, across metropolitan and nonmetropolitan areas. The percent of variation for females in the mid-Atlantic region is twice the value for the Far West. In the Far West, the value for the metropolitan area is twice that for the nonmetropolitan area. Male-female comparisons show mixed results: in the Far West, the percent of variation in ACHV explained by HB is higher for males irrespective of area; in the mid-Atlantic region, the same applies to females.

Commonality analyses for the home background measures of SES and FSS, shown in table B.22, exhibit marked regional differences. In the mid-Atlantic region the unique role of FSS is from 2 to 3 times greater than that for SES, with the portion common to both SES and FSS accounting for approximately one-third. In the Far Western nonmetropolitan area, the situation is reversed. The "total" figures here indicate that the role of SES is more than 4 times greater than that for FSS, while in the metropolitan area their roles are approximately equal. The role for males in the Far West shows a remarkable turnabout between nonmetropolitan and metropolitan areas: in the former, the role of SES is approximately 3½ times greater than that for FSS, while in the latter the role of FSS is 3 times greater than that for SES. The female roles do not appreciably change between nonmetropolitan and metropolitan areas in the Far West; on the whole, however, the SES values predominate.

Sex differences occur among all areas to some extent, but the greatest difference occurs in the metropolitan area of the Far West. For males, the role of FSS is 3 times larger than that for SES, while for females the role of SES is almost 5 times larger than that for FSS.

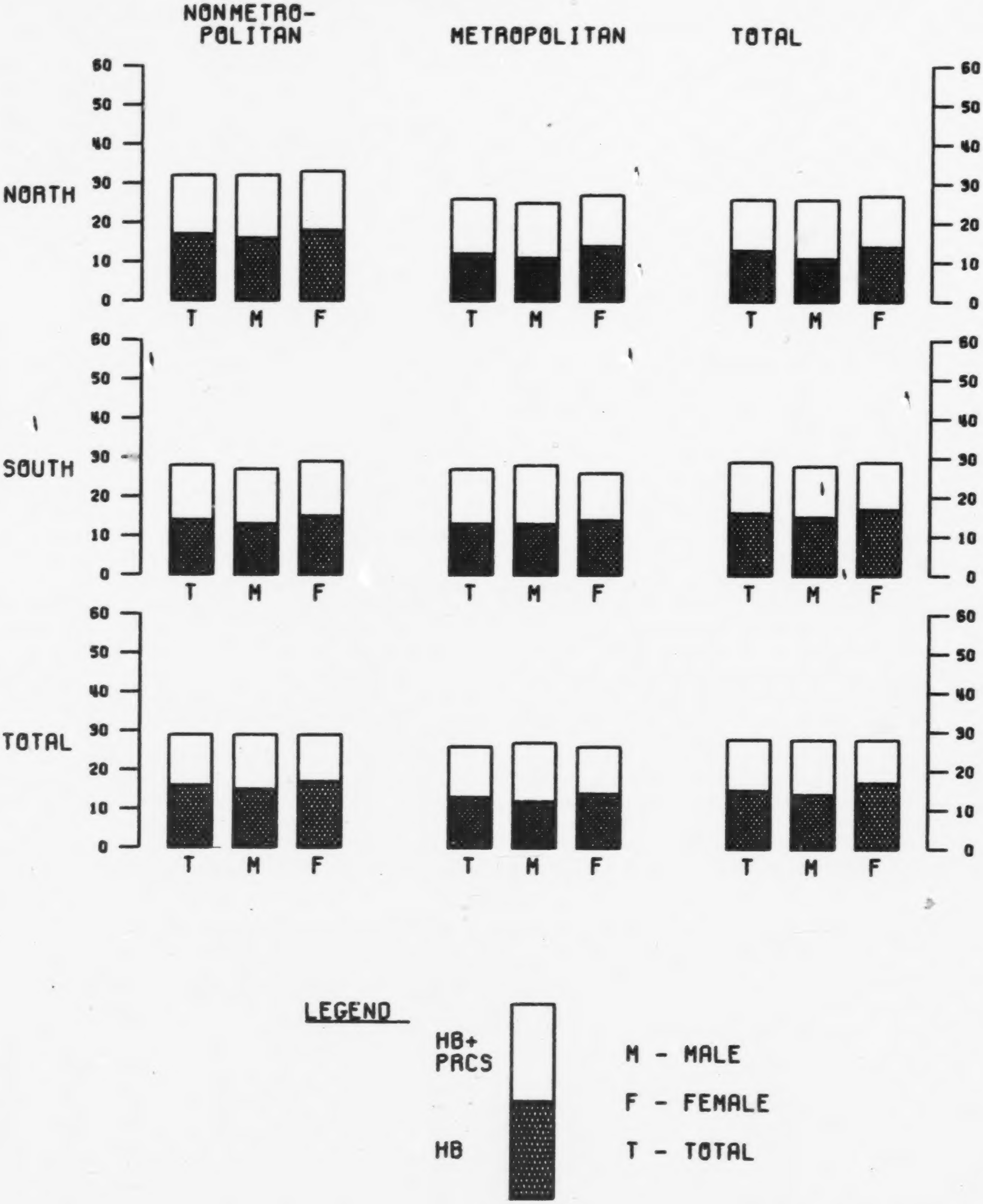
It is apparent, then, that the relative role of either SES or FSS in understanding ACHV depends very much on region and sex. For males, FSS plays a greater role than SES in metropolitan areas; for females, the relative role of SES or FSS depends on the region. In nonmetropolitan areas SES plays a greater role in ACHV than FSS for both males and females.

The shaded and plain areas together in figure B.5 represent the absolute values for the R-squares when HB and PRCS are both entered into the regression analysis. As for other racial-ethnic groups, the percentage of variation in ACHV accounted for by HB factors alone is increased substantially when PRCS factors are entered into the re-

Table B.23.—Commonality Analyses of Home Background and Process, by Sex and Geographic Location, for Oriental-Americans

| Region | Sex | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| | | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| Mid-Atlantic | Male | .. | .. | .. | 3 | 60 | 37 | 1 | 70 | 29 |
| | Female | .. | .. | .. | 19 | 39 | 42 | 21 | 39 | 40 |
| | Total | .. | .. | .. | 8 | 49 | 43 | 5 | 57 | 38 |
| Far West | Male | 17 | 56 | 27 | 8 | 36 | 56 | 13 | 47 | 40 |
| | Female | 3 | 86 | 11 | 14 | 57 | 29 | 3 | 75 | 22 |
| | Total | 7 | 66 | 27 | 11 | 46 | 43 | 8 | 57 | 35 |
| Total | Male | 14 | 56 | 30 | 9 | 31 | 60 | 11 | 44 | 45 |
| | Total | 1 | 72 | 27 | 10 | 47 | 43 | 4 | 58 | 38 |
| | Female | 8 | 61 | 31 | 9 | 38 | 53 | 8 | 49 | 43 |

FIGURE B.4. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY SEX AND GEOGRAPHIC LOCATION, FOR NEGROES



B.4 (49a)

Table B.18.—Commonality Analyses of Home Background and Process, by Sex and Geographic Location, for Negroes

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | Male | 17 | 50 | 33 | 7 | 58 | 35 | 9 | 57 | 34 |
| | Female | 19 | 46 | 35 | 14 | 49 | 37 | 15 | 48 | 37 |
| | Total | 19 | 48 | 33 | 11 | 53 | 36 | 12 | 52 | 36 |
| South | Male | 14 | 53 | 33 | 12 | 52 | 36 | 17 | 48 | 35 |
| | Female | 18 | 48 | 34 | 18 | 46 | 36 | 22 | 41 | 37 |
| | Total | 17 | 50 | 33 | 15 | 50 | 35 | 20 | 45 | 35 |
| Total | Male | 19 | 48 | 33 | 10 | 54 | 36 | 16 | 48 | 36 |
| | Female | 22 | 43 | 35 | 17 | 47 | 36 | 23 | 41 | 36 |
| | Total | 21 | 46 | 33 | 14 | 51 | 35 | 20 | 45 | 35 |

politan South, metropolitan North, and metropolitan South, in descending order.

Commonality analyses of the HB and PRCS measures given in table B.18 show that for all groups the dominant trend is for the role of PRCS to exceed that of HB. The trend is somewhat more pronounced in metropolitan areas: the northern ones have a value of 4.8 and the southern ones of 3.3. In nonmetropolitan areas, however, the values are: North, 2.5; and South, 2.9. For each regional group the role of PRCS is greater for males than for females, while HB has a somewhat greater role for females. For males PRCS exceeds HB as follows (in descending order): metropolitan North; metropolitan South; nonmetropolitan South; and nonmetropolitan North. For females this same order tends to hold—in particular, the two southern groups are very close together in magnitude—but the extent to which PRCS exceeds HB is much less pronounced than for males.

In summary:

1. For all groups distinguished by sex and region, the role of PRCS substantially exceeds that of HB.

2. PRCS plays a greater role for males than females while HB plays a greater role for females than males.

3. For males the extent to which PRCS exceeds HB is greatest in metropolitan areas, while for females this departure is greatest in the metropolitan North.

We turn now to the roles played by EDPLN when placed in context with MTVTN, as the other PRCS measures are known. The usual adjustments were made in ACHV for differences in HB. Figure B.4 shows that for males as well as females the adjusted portion of R-squares (represented by the plain areas in the bar charts) is largest in the nonmetropolitan North, with the values for the other groups falling close together. The commonality analyses in table B.19 show that for the group totals the role of MTVTN is about equal to or exceeds that of EDPLN. Although this is clearly the trend in both the metropolitan North and the nonmetropolitan South, the differences among regions in this regard are not very great. Examination of sex differences shows that, except for the metropolitan North, the role of EDPLN is greater for males than for females, while the role of MTVTN is greater for females than for males. In the metropolitan North the role of EDPLN is of the same magnitude for both sexes, but the role of MTVTN remains larger for females than for males. For males in the nonmetropolitan North and metropolitan South the role of EDPLN exceeds that of MTVTN by about 1.4 to 1. For males in other regions, MTVTN exceeds EDPLN almost to the same extent. For females in all regions, the role of MTVTN exceeds that of EDPLN as follows: nonmetropolitan North, 2.6 to 1; nonmetropolitan South, 2 to 1; metropolitan North, 1.9 to 1; and metropolitan South, 1.4 to 1.

In summary:

1. For group totals the role of MTVTN equals or exceeds that of EDPLN; the extent to which it does so is largest in the metropolitan North and smallest in the metropolitan South.

The role of MTVTN is larger for females than for males,

Table B.19.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Sex and Geographic Location, for Negroes

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | EDPLN | MTVTN | | EDPLN | MTVTN | | EDPLN | MTVTN | |
| North | Male | 35 | 23 | 42 | 22 | 31 | 47 | 26 | 28 | 46 |
| | Female | 17 | 45 | 38 | 22 | 41 | 37 | 22 | 40 | 38 |
| | Total | 27 | 32 | 41 | 22 | 35 | 43 | 24 | 33 | 43 |
| South | Male | 28 | 30 | 42 | 34 | 26 | 40 | 32 | 26 | 42 |
| | Female | 20 | 40 | 40 | 28 | 38 | 34 | 25 | 38 | 37 |
| | Total | 24 | 34 | 42 | 31 | 30 | 39 | 29 | 31 | 40 |
| Total | Male | 25 | 35 | 40 | 27 | 30 | 43 | 29 | 30 | 41 |
| | Female | 15 | 49 | 36 | 24 | 41 | 35 | 23 | 42 | 35 |
| | Total | 20 | 41 | 39 | 25 | 34 | 41 | 26 | 35 | 39 |

while the role of EDPLN is larger for males than for females, except in the metropolitan North where they are equal.

3. For males the role of EDPLN was greater than that of MTVTN in the nonmetropolitan North and metropolitan South, while in the other areas the role of MTVTN exceeded that of EDPLN. In all of the other groups the role of MTVTN exceeded that of EDPLN and the extent of this departure was greatest in the nonmetropolitan North and least in the metropolitan South.

**Table B.20.—Mean Achievement of Negroes, by Sex and Geographic Location**

| Region | Sex | Mean ACHV | | |
|---|---|---|---|---|
| | | Nonmetropolitan | Metropolitan | Total |
| North | Male | 43.15 | 43.62 | 43.54 |
| | Female | 42.58 | 43.55 | 43.38 |
| | Total | 42.86 | 43.58 | 43.46 |
| South | Male | 38.04 | 40.69 | 39.49 |
| | Female | 38.36 | 41.85 | 40.27 |
| | Total | 38.20 | 41.28 | 39.89 |
| Total | Male | 39.48 | 42.45 | 41.52 |
| | Female | 39.50 | 42.86 | 41.81 |
| | Total | 39.49 | 42.66 | 41.67 |

Table B.20 presents mean ACHV by region and sex. The regional scores fall in the following descending sequence irrespective of sex: metropolitan North; nonmetropolitan North; metropolitan South; and nonmetropolitan South. The direction and magnitude of the sex differences within each region vary somewhat. In the metropolitan North mean ACHV is about the same for males and females, in the nonmetropolitan North it is slightly lower for females, and in the South, both metropolitan and nonmetropolitan, it is slightly lower for males. The greatest mean difference occurs between males in the metropolitan North and nonmetropolitan South; this difference is on the order of almost .6 of a standard deviation.

Analyses in this section have shown that:

1. In the metropolitan North the role of SES is much smaller and the common portion much larger than elsewhere, while the role of FSS is somewhat larger.

2. For all groups the role of SES is greater than that of FSS.

3. In the South and metropolitan North the role of FSS is greater for males than for females; however, this effect is reversed in the nonmetropolitan North.

4. For all groups, irrespective of region or sex, the role of PRCS substantially exceeds that of HB; the extent by which it does so is greater for males than for females.

5. The role of EDPLN exceeds that of MTVTN for males in the nonmetropolitan North and metropolitan South but is less than it elsewhere; for females, however, the role of MTVTN exceeds that of EDPLN everywhere.

6. Mean ACHV for each region falls in a descending sequence as follows: metropolitan North; nonmetropolitan North; metropolitan South; and nonmetropolitan South.

7. Within each region, differences in ACHV between males and females tended to be small (about 1 point or less); only in the South did females lead males.

8. The largest difference in mean ACHV was between males: those in the metropolitan North scored higher than those in the nonmetropolitan South by .6 of a standard deviation.

## B.5. ORIENTAL-AMERICANS

Oriental-Americans make up a very small percentage of the total United States population. The number of Oriental-American children of school age (5–19) at the time of this survey (fall, 1965) may be approximated by the number of such children aged 0–14 in 1960. The following table shows that, in 1960, children under 14 of parents classified by the U.S. Census as being of Japanese, Chinese, or Filipino descent totaled about 287,000 or less than 1 percent of the total U.S. population in this particular age category.

**Population Distribution of White and Selected Nonwhite Races, 0–14 Years of Age, United States, 1960**

| Race | Number | Percent |
|---|---|---|
| Japanese | 148,167 | .27 |
| Chinese | 77,894 | .14 |
| Filipino | 60,632 | .11 |
| All Other | 55,510,186 | 99.48 |

Source: Adapted from table 155-U.S. Bureau of the Census, *U.S. Census of Population: 1960*, Vol. I, Characteristics of the Population: part I, United States Summary, U.S. Government Printing Office, Washington, D.C., 1964 (whites); and tables 1–6 U.S. Bureau of the Census, *U.S. Census of Population: 1960 Subject Reports*, Non-White Population by Race, Fiscal Report PC(2)-1C, U.S. Government Printing Office, Washington, D.C., 1963.

**Table B.21.—Number of 9th-Grade Oriental-Americans Included in the Analyses, by Sex and Geographic Location**

| Region | Sex | Nonmetropolitan | Metropolitan | Total |
|---|---|---|---|---|
| Mid-Atlantic | Male | ... | 169 | 170 |
| | Female | ... | 149 | 150 |
| | Total | ... | 318 | 320 |
| Far West | Male | 137 | 465 | 602 |
| | Female | 91 | 476 | 567 |
| | Total | 228 | 941 | 1,169 |
| Total | Male | 186 | 686 | 872 |
| | Female | 125 | 678 | 803 |
| | Total | 311 | 1,364 | 1,675 |

It follows that analyses of regional differences among Oriental-Americans must necessarily be limited to those regions where an adequate sample can be obtained. In our survey, as may be seen in table B.21, the regions under consideration are not the same as those for the other racial-ethnic groups treated in this chapter. Here, the regions chosen perforce reflect those areas within the United States that have the highest concentrations of Oriental-Americans, namely, the mid-Atlantic and Far Western regions.[2] Of the total number of Oriental-American children aged 0–14 in 1960, 72 percent resided in California, Ha-

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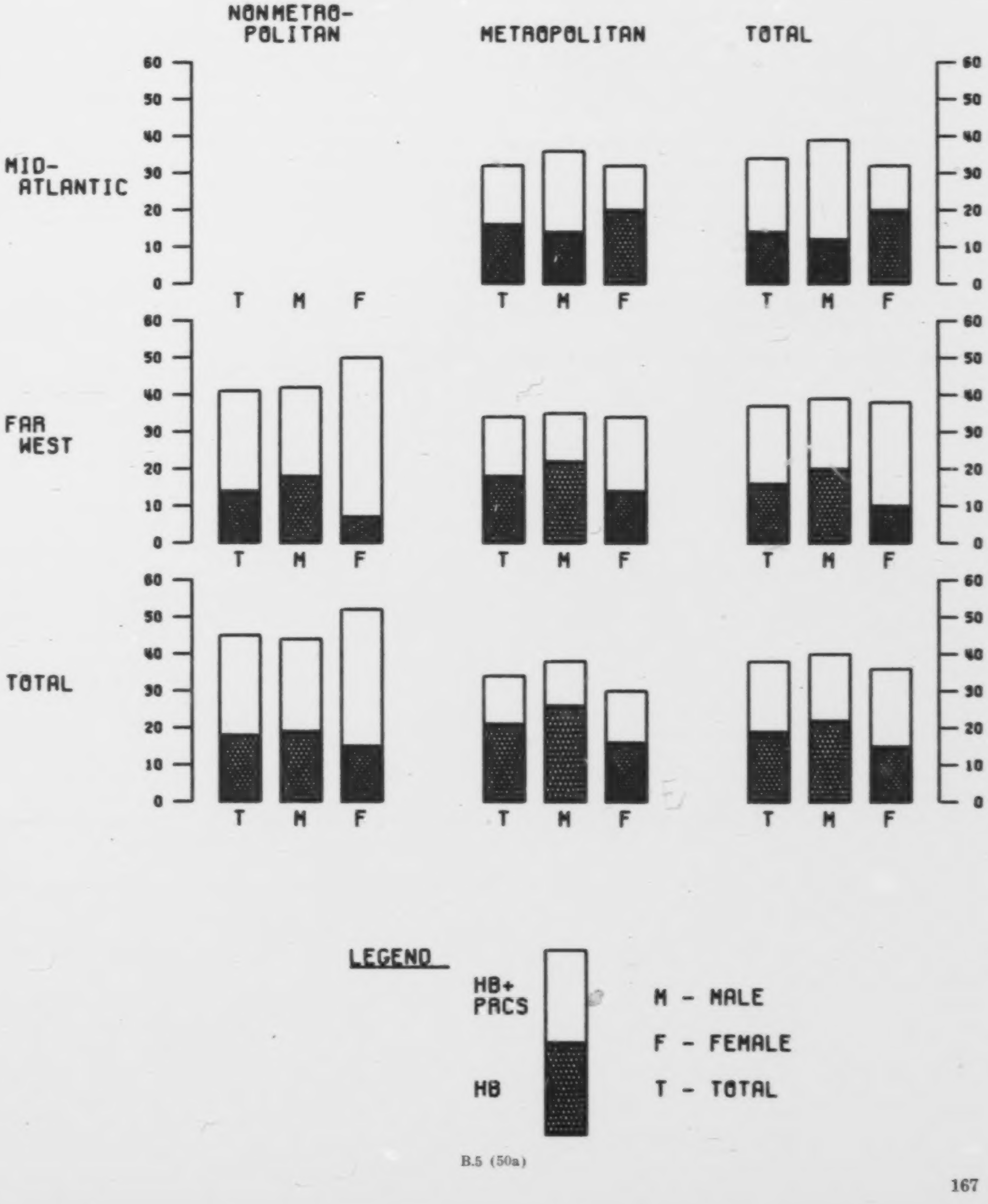
[2] The States in these regions are as follows. Middle Atlantic: Delaware; Washington, D.C.; New Jersey; Pennsylvania; New York. Far Western: Alaska; California; Colorado; Hawaii; Idaho; Montana; Nevada; Oregon; Utah; Washington; Wyoming.

FIGURE B.5. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY SEX AND GEOGRAPHIC LOCATION, FOR ORIENTAL AMERICANS



B.5 (50a)

## B.4. NEGRO AMERICANS

Table B.16 shows the number of Negro students included in these analyses. It is evident that the greatest number surveyed (39 percent) are from the metropolitan North, with the next largest group (36 percent) being from the nonmetropolitan South. The metropolitan South comes third (22 percent) and the nonmetropolitan North last (3 percent). The last-named, although relatively few, are sufficiently numerous to support generalizations from the kinds of analysis conducted here.

The R-squares for the HB measures in figure B.4 show that the extent to which they explain ACHV is greatest in nonmetropolitan areas. The North is first in this respect and the South lags behind it only by about 3 percentage points. In metropolitan areas the reverse occurs: the R-squares tend to be larger in the South than in the North by about 1 to 2 percentage points.

**Table B.16.—Number of 9th-Grade Negroes Included in the Analyses, by Sex and Geographic Location**

| Region | Sex | Nonmetropolitan | Metropolitan | Total |
|---|---|---|---|---|
| North | Male | 605 | 7,024 | 7,629 |
| | Female | 607 | 7,426 | 8,033 |
| | Total | 1,212 | 14,450 | 15,662 |
| South | Male | 6,410 | 4,050 | 10,460 |
| | Female | 6,952 | 4,191 | 11,143 |
| | Total | 13,362 | 8,241 | 21,603 |
| Total | Male | 7,015 | 11,074 | 18,089 |
| | Female | 7,559 | 11,617 | 19,176 |
| | Total | 14,574 | 22,691 | 37,265 |

Commonality analyses of the HB measures, given in table B.17, indicate that as far as the group totals are concerned the absolute values for the percentages are fairly similar, except in the metropolitan North. For this latter group the role of SES is 22 percentage points lower, while that of FSS is 3 to 8 percentage points greater. Noticeable also is the enlarged common portion in the metropolitan North—about 16 to 20 points larger than for the other groups. This indicates that the confounding of SES and FSS is greater in the metropolitan North than elsewhere. This suggests that, in the metropolitan North, incidence of lower FSS is more highly related with incidence of lower SES, and that their joint relationship with ACHV is greater. This result is more pronounced for males than for females.

Examination of the other groups shows that for the group totals as well as for each group of males or females SES exceeds FSS to a dramatic extent. This extent is greatest in the metropolitan South (86 to 1), second greatest in the nonmetropolitan North (29 to 1), third in the nonmetropolitan South (14 to 1), and lowest in the metropolitan North (7 to 1). When sex differences are introduced, however, some of the groups show quite disparate results. Thus in the South and metropolitan North the role of FSS is greater for males than females, and that of SES is greater for females than males. In the nonmetropolitan North, however, the role of SES exceeds that of FSS for males in the following descending order: nonmetropolitan North (95 to 1); metropolitan South (44 to 1); nonmetropolitan South (10 to 1); and metropolitan North (5 to 1). For females SES exceeds FSS in a different order, as follows: metropolitan South (91 to 1); nonmetropolitan South (22 to 1); and metropolitan and nonmetropolitan North (both about 10 to 1).

In summary, these analyses have shown that:

1. The role of SES is much smaller in the metropolitan North than elsewhere, while that of the common portion is much larger and that of FSS somewhat larger.
2. For all groups the role of SES exceeds that of FSS, sometimes dramatically (e.g., in the South, by 44 to 1).
3. In the South and metropolitan North the role of FSS is greater for males and the role of SES greater for females, but this trend is reversed in the nonmetropolitan North.

Our next question concerns the relative roles of HB and PRCS. Inspection of figure B.4 shows that, when the PRCS measures are brought into the regression analyses, the R-squares increase most in the nonmetropolitan North, but are similar in magnitude for the other geographic groups. The absolute values of the R-squares indicate that the extent to which ACHV is explained for both sexes is greatest in the nonmetropolitan North. Elsewhere, there are major sex differences, with the values for males being greatest in the metropolitan and nonmetropolitan South, and somewhat smaller in the metropolitan North. For females, however, the largest values are in the nonmetro-

**Table B.17.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Sex and Geographic Location, for Negroes**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | SES | FSS | | SES | FSS | | SES | FSS | |
| North | Male | 95 | 1 | 4 | 55 | 11 | 34 | 65 | 8 | 27 |
| | Female | 80 | 8 | 12 | 68 | 7 | 25 | 71 | 7 | 22 |
| | Total | 88 | 3 | 9 | 62 | 9 | 29 | 69 | 7 | 24 |
| South | Male | 80 | 8 | 12 | 88 | 2 | 10 | 84 | 3 | 13 |
| | Female | 88 | 4 | 8 | 91 | 0 | 9 | 92 | 1 | 7 |
| | Total | 84 | 6 | 10 | 86 | 1 | 13 | 88 | 2 | 10 |
| Total | Male | 85 | 5 | 10 | 70 | 5 | 25 | 79 | 3 | 18 |
| | Total | 87 | 4 | 9 | 80 | 2 | 18 | 86 | 2 | 12 |
| | Female | 86 | 4 | 10 | 75 | 4 | 21 | 83 | 2 | 15 |

**Table B.24.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Sex and Geographic Location, for Oriental-Americans**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | EDPLN | MTVTN | | EDPLN | MTVTN | | EDPLN | MTVTN | |
| Mid-Atlantic | Male | | | | 32 | 39 | 29 | 46 | 28 | 26 |
| | Female | | | | 7 | 48 | 45 | 5 | 54 | 41 |
| | Total | | | | 19 | 41 | 40 | 30 | 33 | 37 |
| Far West | Male | 61 | 32 | 7 | 41 | 13 | 46 | 62 | 18 | 20 |
| | Female | 22 | 32 | 46 | 53 | 23 | 24 | 35 | 26 | 39 |
| | Total | 44 | 25 | 31 | 47 | 17 | 36 | 49 | 19 | 32 |
| Total | Male | 57 | 29 | 14 | 44 | 17 | 39 | 57 | 19 | 24 |
| | Female | 29 | 29 | 42 | 43 | 28 | 29 | 39 | 26 | 35 |
| | Total | 46 | 23 | 31 | 44 | 20 | 36 | 49 | 19 | 32 |

gression with HB. For most groups, the addition of PRCS factors more than doubles the percent of variation in ACHV accounted for by HB factors alone.

Inspection of the commonality analyses in table B.23 shows that of the common variance in ACHV accounted for by HB and PRCS variables, the unique role of PRCS far exceeds that of HB in every instance. The extent of this predominance is greater for the nonmetropolitan than the metropolitan area (by 8 to 1 compared with 4 to 1), and for the Middle Atlantic than the Far Western region (by 11 to 1 compared with 7 to 1).

In the Far West the role of HB for males is greater than that for females while in the mid-Atlantic region the role of HB is greater for females. In nonmetropolitan areas, the roles are nearly equal.

For the PRCS variables, the role for males is greater than for females in the mid-Atlantic region, while the reverse is true for the Far West. In both nonmetropolitan and metropolitan areas, the role of PRCS for females is greater than for males.

To summarize the commonality analyses for HB and PRCS: in the Middle Atlantic and Far Western regions, as well as the nonmetropolitan areas, the relative dominance of one sex over the other within a particular region is reciprocal. In other words, if for one sex HB plays the greater role in ACHV, then PRCS plays the greater role for the other. In metropolitan areas, however, this type of reciprocity does not obtain.

Table B.24 presents commonality analyses of the relationship between EDPLN and ACHV in context with the measures collectively designated as MTVTN. Here the results have first been adjusted for differences among students in HB. Inspection of the total percentages for all regions shows that everywhere EDPLN is approximately twice as large as MTVTN with one exception: the mid-Atlantic metropolitan area. Here, for both males and females, the role of MTVTN is greater than that of EDPLN. Further, the role of MTVTN for females is almost 7 times greater than that for EDPLN. In the Far Western nonmetropolitan area, the MTVTN figures for females are almost half as large again as those for EDPLN. For U.S. totals, the role of EDPLN in nonmetropolitan areas is twice as large as that of MTVTN for males, but equal for females. In metropolitan areas, however, both male and female figures for EDPLN are much larger than those for MTVTN.

In summary, although EDPLN generally plays a greater role than MTVTN in explaining ACHV among Oriental-Americans, the exceptions show that MTVTN is also an important factor. Variations appear to depend on which area is under consideration, and whether the group is male or female.

Mean ACHV for Oriental-Americans is given in table B.25. Inspection of the total values shows that the Far West far exceeds the mid-Atlantic area, while there exists very little difference between the metropolitan and nonmetropolitan figures. Comparisons between areas show that, in the Far West, metropolitan males have higher scores than nonmetropolitan males, while for females the reverse is true. For U.S. totals, the higher scores of females in nonmetropolitan areas are not quite matched by those of males in metropolitan areas. Males have both the lowest figures in the metropolitan mid-Atlantic, and the highest in the metropolitan Far West; the difference is slightly greater than one-half of a standard deviation.

**Table B.25.—Mean Achievement of Oriental-Americans, by Sex and Geographic Location**

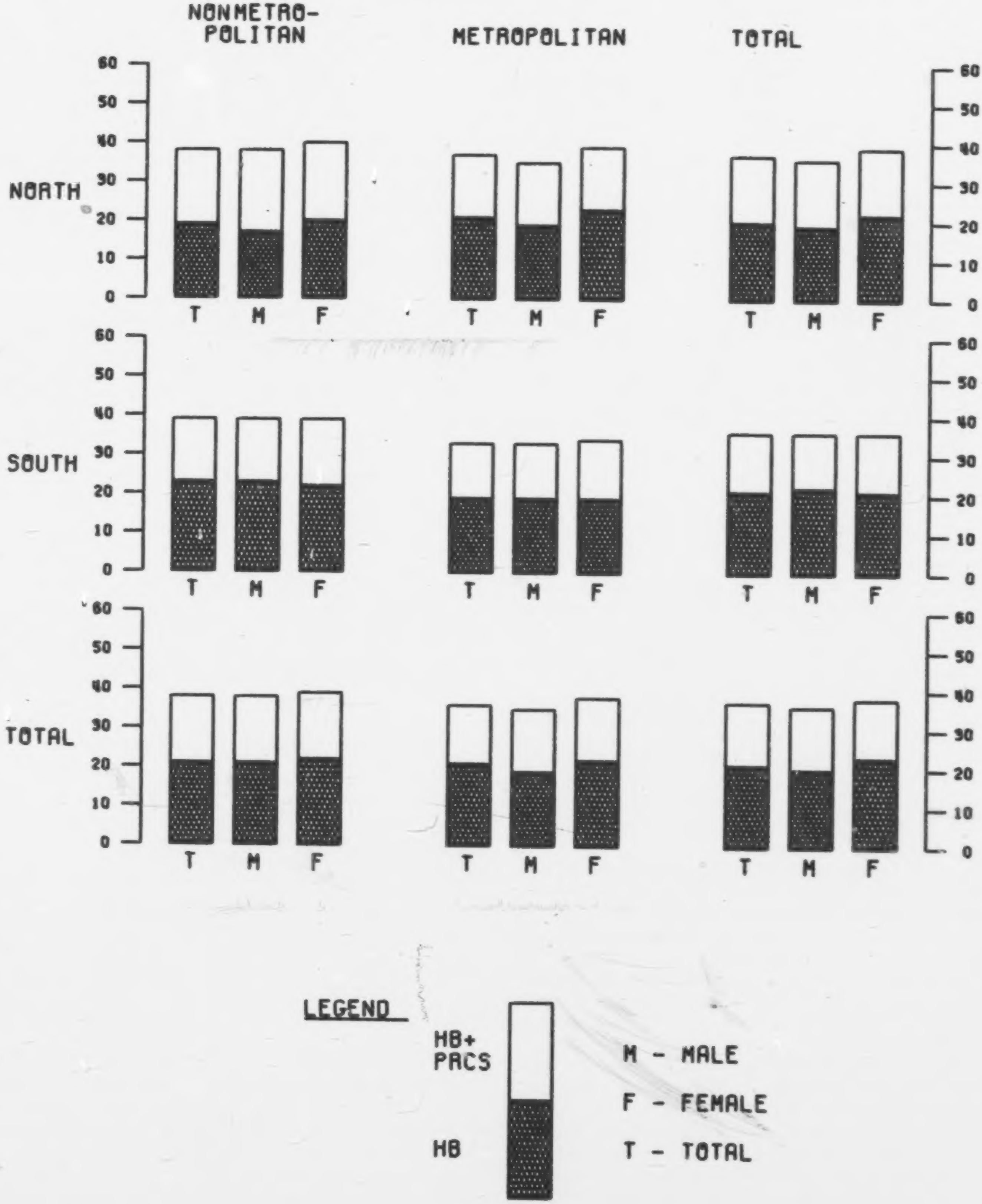
| | | Mean ACHV | | |
|---|---|---|---|---|
| Region | Sex | Nonmetropolitan | Metropolitan | Total |
| Mid-Atlantic | Male | | 48.11 | 47.55 |
| | Female | | 49.08 | 48.76 |
| | Total | | 48.53 | 48.07 |
| Far West | Male | 50.92 | 53.97 | 52.34 |
| | Female | 53.35 | 52.34 | 52.81 |
| | Total | 51.87 | 53.22 | 52.54 |
| Total | Male | 50.00 | 51.59 | 50.88 |
| | Female | 52.72 | 50.64 | 51.43 |
| | Total | 51.10 | 51.14 | 51.13 |

In summary, analyses in this section have shown that:

1. The extent to which ACHV is explained by SES and FSS varies by sex, region, and area, being greater for males in the Far West (both metropolitan and nonmetropolitan) and greater for females in the mid-Atlantic.

2. The relative roles of SES and FSS in explaining ACHV also depends upon sex group and geographic loca-

FIGURE B.6. - PERCENT OF VARIATION IN ACHIEVEMENT ACCOUNTED FOR BY HOME BACKGROUND SINGLY AND IN COMBINATION WITH PROCESS, BY SEX AND GEOGRAPHIC LOCATION, FOR WHITES



tion. The role of SES is greater than that of FSS in nonmetropolitan areas for both males and females. In metropolitan areas, however, the role of FSS was greater than that of SES for males, but for females depended upon whether one resided in the Far West or in the mid-Atlantic.

3. The role of PRCS exceeds that of HB irrespective of region and sex, though some variations are apparent.

4. There is a tendency for the role of EDPLN to exceed that of MTVTN; however, the extent to which this is so depends a great deal on area and to some extent on sex.

5. Males exceed females in average ACHV only in the metropolitan Far West.

6. The greatest difference in average ACHV is between males in the metropolitan mid-Atlantic and metropolitan Far West—a difference slightly greater than one-half of a standard deviation.

## B.6. WHITE AMERICANS

Table B.26 shows that, of all the whites included in the study, the largest proportion (56 percent) were from the metropolitan North. The next-to-largest were from the nonmetropolitan South (20 percent) and the nonmetropolitan North (15 percent). The smallest proportion (9 percent) were from the metropolitan South.

The percent of variation in ACHV explained by the HB measures, represented by the shaded areas in figure B.6, indicates that the portion explained tends to be greatest in the nonmetropolitan South and metropolitan North, with the metropolitan South and nonmetropolitan North trailing close behind. This ordering changes, but not by much, when sex differences are introduced.

**Table B.26.—Number of 9th-Grade Whites Included in the Analyses, by Sex and Geographic Location**

| Region | Sex | Nonmetropolitan | Metropolitan | Total |
|---|---|---|---|---|
| North | Male | 6,132 | 21,651 | 27,783 |
| | Female | 5,698 | 21,149 | 26,847 |
| | Total | 11,830 | 42,800 | 54,630 |
| South | Male | 7,736 | 3,481 | 11,217 |
| | Female | 7,502 | 3,404 | 10,906 |
| | Total | 15,238 | 6,885 | 22,123 |
| Total | Male | 13,868 | 25,132 | 39,000 |
| | Female | 13,200 | 24,553 | 37,753 |
| | Total | 27,068 | 49,685 | 76,753 |

Commonality analyses for these HB measures, given in table B.27, show that the dominant trend for all regions is for the role of SES to outweigh that of FSS, sometimes by as much as 90 to 1. The role of SES is less in the metropolitan North than elsewhere. However, examination of sex differences shows that this difference is more pronounced for males than for females. Overall, the role of FSS tends to be greater for males than for females except in the metropolitan South. But the differences in any case are slight, and the role of SES is uniformly greater for females than for males. The role of SES also exceeds that of FSS somewhat more in the South than in the North, but this applies far more to females than males, especially in the South.

As before, our second question deals with the relative roles of PRCS and HB in the development of ACHV. Inspection of the *R*-squares for the PRCS measures entered jointly with the HB measures (viz, both the plain and shaded portions of the bars in figure B.6) shows that the increase attributable to the PRCS measures (i.e., the plain areas) is greatest in the nonmetropolitan North. The increments in the metropolitan North and nonmetropolitan South are slightly smaller, and are closer together in magnitude. The increments in the metropolitan South are even smaller. When the absolute values of the *R*-squares are inspected it will be noted that the level of explanation is greater in nonmetropolitan than in metropolitan areas. The extent of this difference is greater in the South than in the North.

Inspection of the commonality analyses in table B.28 shows that the dominant trend in all groups is for the role of PRCS to exceed that of HB. This trend is strongest in the nonmetropolitan North (8.5 to 1), less strong in the metropolitan North and nonmetropolitan South (5 to 1), and weakest in the metropolitan South (4 to 1). When sex differences are introduced for the North the role of PRCS is shown to be greater for males than for females, while the role of HB is greater for females than males. In the South, however, the roles of both PRCS and HB are slightly greater for females than for males. For males, the role of PRCS exceeds HB as follows: nonmetropolitan North (14 to 1); metropolitan North and nonmetropolitan South (6 to 1); and metropolitan South (5 to 1). For females, the role of PRCS exceeds that of HB more in nonmetropolitan than in metropolitan areas, as follows: nonmetro-

**Table B.27.—Commonality Analyses of Socio-Economic Status and Family Structure and Stability, by Sex and Geographic Location, for Whites**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | SES | FSS | | SES | FSS | | SES | FSS | |
| North | Male | 81 | 3 | 16 | 71 | 5 | 24 | 74 | 4 | 22 |
| | Female | 84 | 2 | 14 | 82 | 1 | 17 | 83 | 1 | 16 |
| | Total | 82 | 2 | 16 | 77 | 3 | 20 | 78 | 3 | 19 |
| South | Male | 87 | 1 | 12 | 81 | 0 | 19 | 85 | 1 | 14 |
| | Female | 90 | 1 | 9 | 88 | 0 | 12 | 89 | 1 | 10 |
| | Total | 88 | 1 | 11 | 84 | 0 | 16 | 87 | 1 | 12 |
| Total | Male | 84 | 2 | 14 | 73 | 3 | 24 | 79 | 2 | 19 |
| | Female | 87 | 1 | 12 | 84 | 1 | 15 | 85 | 1 | 14 |
| | Total | 86 | 1 | 13 | 78 | 2 | 20 | 82 | 2 | 16 |

**Table B.28.—Commonality Analyses of Home Background and Process, by Sex and Geographic Location, for Whites**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | HB | PRCS | | HB | PRCS | | HB | PRCS | |
| North | Male | 4 | 54 | 42 | 8 | 46 | 46 | 6 | 48 | 46 |
| | Female | 8 | 49 | 43 | 10 | 42 | 48 | 10 | 44 | 46 |
| | Total | 6 | 51 | 43 | 9 | 44 | 47 | 8 | 46 | 46 |
| South | Male | 7 | 40 | 53 | 9 | 42 | 49 | 8 | 40 | 52 |
| | Female | 9 | 42 | 49 | 12 | 43 | 45 | 12 | 41 | 47 |
| | Total | 8 | 41 | 51 | 11 | 42 | 47 | 10 | 41 | 49 |
| Total | Male | 6 | 46 | 48 | 8 | 46 | 46 | 7 | 44 | 49 |
| | Female | 10 | 44 | 46 | 11 | 41 | 48 | 12 | 41 | 47 |
| | Total | 8 | 45 | 47 | 10 | 43 | 47 | 10 | 43 | 47 |

**Table B.29.—Commonality Analyses of Educational Plans and Other Motivational Measures, by Sex and Geographic Location, for Whites**

| | | Nonmetropolitan | | | Metropolitan | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unique | | Common | Unique | | Common | Unique | | Common |
| Region | Sex | EDPLN | MTVTN | | EDPLN | MTVTN | | EDPLN | MTVTN | |
| North | Male | 31 | 23 | 46 | 28 | 25 | 47 | 29 | 24 | 47 |
| | Female | 23 | 37 | 41 | 23 | 34 | 43 | 23 | 34 | 43 |
| | Total | 27 | 30 | 43 | 24 | 31 | 45 | 25 | 31 | 44 |
| South | Male | 33 | 27 | 40 | 40 | 16 | 44 | 37 | 21 | 42 |
| | Female | 22 | 38 | 40 | 27 | 34 | 39 | 26 | 34 | 40 |
| | Total | 27 | 33 | 40 | 32 | 26 | 42 | 30 | 28 | 42 |
| Total | Male | 33 | 24 | 43 | 31 | 23 | 46 | 32 | 23 | 45 |
| | Female | 23 | 37 | 40 | 24 | 34 | 42 | 24 | 34 | 42 |
| | Total | 28 | 31 | 41 | 26 | 30 | 44 | 27 | 30 | 43 |

politan North (6 to 1); nonmetropolitan South (5 to 1); metropolitan North (4.2 to 1); and metropolitan South (3.6 to 1).

In summary:

1. The role of PRCS uniformly exceeds that of HB for both sexes in all areas.
2. The extent to which it does so is greatest in the nonmetropolitan North and least in the metropolitan South.
3. In the North the role of PRCS is greater for males than females and that of HB is greater for females than males, while in the South the roles of both HB and PRCS are greater for females than for males.

We now turn to the role that EDPLN plays with the other PRCS measures—that is, with MTVTN—after the differences associated with HB have been subtracted out of ACHV. The portions of the *R*-squares being dealt with are those represented by the plain portions of the bars in figure B.6. It will be noted that these portions are 3 to 5 percentage points larger in the nonmetropolitan North than in the metropolitan North and nonmetropolitan South. The values for these latter groups are in turn only 1 to 2 points larger than those for the metropolitan South. The commonality analyses of these measures, given in table B.29, show that the role of MTVTN exceeds that of EDPLN in the North and nonmetropolitan South; however, in the metropolitan South the role of EDPLN exceeds that of MTVTN. Inspection of differences by sex shows that for males the role of EDPLN uniformly exceeds that of MTVTN to an extent that is greatest in the metropolitan South (2.5 to 1) and roughly similar elsewhere (about 1.2 to 1). For females the trend is reversed: the role of MTVTN exceeds that of EDPLN in the nonmetropolitan South (1.7 to 1), in the North (1.5 to 1), and in the metropolitan South (1.3 to 1).

In summary:

1. For males the role of EDPLN exceeds that of MTVTN for all geographic regions, especially in the metropolitan South.
2. For females the role of MTVTN exceeds that of EDPLN to an extent that is greatest in the nonmetropolitan South and least in the metropolitan South.

Table B.30 presents mean ACHV for each of these groups. In descending order, the values by region line up as follows: metropolitan North, nonmetropolitan North,

**Table B.30.—Mean Achievement of Whites, by Sex and Geographic Location**

| | | Mean ACHV | | |
|---|---|---|---|---|
| Region | Sex | Nonmetropolitan | Metropolitan | Total |
| North | Male | 52.48 | 53.48 | 53.17 |
| | Female | 53.49 | 54.14 | 53.94 |
| | Total | 52.97 | 53.81 | 53.55 |
| South | Male | 49.99 | 51.22 | 50.53 |
| | Female | 51.23 | 52.25 | 51.68 |
| | Total | 50.60 | 51.73 | 51.10 |
| Total | Male | 51.40 | 52.99 | 52.38 |
| | Female | 52.48 | 53.72 | 53.25 |
| | Total | 51.92 | 53.35 | 52.81 |

metropolitan South, and nonmetropolitan South. This sequence remains the same for males and females. Within each geographic area females score higher than males. This difference amounts to 1.2 points in the nonmetropolitan South, 1 point in the metropolitan South and nonmetropolitan North, and .7 of a point in the metropolitan North. The largest difference is between males in the northern metropolitan and southern nonmetropolitan areas and amounts to almost 4 points, or .4 of a standard deviation.

Analyses in this section have shown that:

1. There was a dominant trend for the role of SES to exceed that of FSS, especially in the South.

2. For both sexes and all areas the role of PRCS exceeds that of HB, to the greatest extent in the nonmetropolitan North and to the least in the metropolitan South.

3. In the North the role of PRCS is greater for males than for females, but in the South the roles of HB and PRCS are both larger for females than for males.

4. The role of EDPLN exceeds that of MTVTN for males, especially in the metropolitan South, while for females the role of MTVTN exceeds that of EDPLN, especially in the nonmetropolitan South.

5. Mean ACHV scores were observed as follows, in descending order: metropolitan North; nonmetropolitan North; metropolitan South; nonmetropolitan South.

6. Females scored higher than males in all regions, especially in the nonmetropolitan South, where the differences are on the order of .12 of a standard deviation.

7. The largest difference in mean ACHV was found between males in the metropolitan North and nonmetropolitan South, and was on the order of almost .4 of a standard deviation.

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